The Chemical Age

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NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Chemists and the Dye Agreement

THE Federal Council deputation which waited upon the President of the Board of Trade on Tuesday in reference to the possibility of an Anglo-German Dyestuffs agreement properly refrained from entering into any questions of domestic policy and confined themselves to the possible effects of such an agreement on the future of chemical research in this country. Assuming, what everyone is agreed upon, that the dyestuff industry is essential to the progress of organic chemistry, and that progress in research in organic chemistry is inseparable from research in the dyestuff industry, Sir William Pope, who introduced the deputation, urged strongly that no steps should be taken which would allow the "control of advance" to revert to German hands. That is really the central point in the case, though in the absence of any definite information as to the terms of the agreement it is impossible at present to say how far, if at all, that would be affected. The original intention of the Government and of the country was obviously that Great Britain should become independent of Germany, and indeed of all foreign nations, in the production of all essential dyestuffs, and this naturally implies complete independence of German scientific knowledge and German works practice. It is only fair to recall that this principle has been laid down again and again as essential by Sir William Alexander himself, and we do not think that he or any other responsible leader would contemplate a step involving any degree of disloyalty to personal pledges or national interests.

How far the Board of Trade itself is familiar or unfamiliar with the terms of the suggested draft agreement no one at present appears to know. If those terms are before the Board and contain provisions which would let down this country and imperil the results of all the constructive work that has been done in the last few years, or the prospects for the future, the President, one would think, would not have any sort of hesitation in expressing his disagreement. But Mr. Sidney Webb's replies on this, as on previous occasions, have been extremely guarded, and a reasonable inference to be drawn is that the matter is still in too nebulous a condition to justify any definite conclusion. The object of the deputation was stated in such broad terms that Mr. Webb had no difficulty at all in expressing his agreement with them, though apparently he is not clear exactly how they are to be carried out. Convinced as he is that the research work in the British industry ought to be done here by British trained chemists, he admits that the method of securing this is not easy. As regards the proposed agreement we believe the position is that the Government can exercise a veto over it and they will hardly undertake so definite a step without submitting the matter to discussion in the House of Commons. Though officially interested in the British Dyestuffs Corporation the Government, as he pointed out, is not a party to the negotiations, and the most he could say on this point was that no agreement would be concluded which was not consistent with the original purpose of the Corporation. The deputation on Tuesday, therefore, leaves the matter very much where it was before. It merely constitutes further evidence for the Board of Trade that the representatives of chemical science in this country are greatly interested in the subject, and are anxious as far as possible to see the interests of British dyestuff research safeguarded to the fullest extent.

This is the situation as it appears to many observers from the outside. When, however, one discusses the matter with those who are supposed to know the facts, one hears opinions confidently expressed in favour of the agreement, and strong claims made as to the advantages which would result from the disclosure of German information, the presence of British chemists in German works, and other matters. The case of methyl alcohol has been quoted as an example. The price here to-day is about £85 a ton, largely imported from America, while Germany, it is said, is able to produce the synthetic product at about £10 or £12 a ton, and their process might be introduced here. As against all this, the question is asked, "Why

should Germany be so anxious to confer such benefits on a British industry?" and to that there is no very clear answer, though dark hints are occasionally allowed to drop.

Apart from the subject under discussion, it is interesting to note the welcome reception which Mr. Sidney Webb in his official capacity continues to give to deputations of this character. Himself a highly cultivated man, with a full appreciation of the part that pure and applied science plays in the welfare of the country, he probably finds it a pleasant break in his official duties to listen to the views of men of the type who spoke on behalf of the Federal Council. No previous President of the Board of Trade has ever been more accessible to interests of this kind, and his invitation to the Federal Council to communicate with the Board of Trade on this or any other chemical topic in which the Council is interested sets a fashion that will be generally approved.

Pulverised Coal Developments

THE Fuel Research Board has just re-issued as a third edition Mr. L. C. Harvey's admirable survey of the utilisation of pulverised coal in America. As a testimony to the initiative and enterprise of the American fuel engineers Mr. Harvey's account of the progress made in a comparatively short time speaks volumes, but in turn it emphasises our own rather lethargic attitude towards novelites of the kind, and it must certainly be confessed that the progress made over here with the new system has all through been extremely disappointing. No doubt many of those who in this country were attracted by the idea of a pulverulent fuel were in the early days deterred by the reports of serious accidents which had occurred in America, and certainly there is a good deal to be said for the argument that by adopting the attitude of interested onlookers we have gained the advantage of an immense amount of practical experience for which we might otherwise have paid heavily. There can, however, be no question that the stage to which the use of quite a number of pulverised fuels has now been carried in America demands that a more active interest should be taken over here, and if fuel users will take the trouble to study Mr. Harvey's report they will have no difficulty in discovering that there is some danger of our export coal trade suffering, owing to the growing number of pulverised coal installations which are springing up on the Continent. The near European countries have learnt to realise that to-day imported coal is something in the nature of a luxury, and if a pulverulent system will permit them to use native resources of an inferior grade they will be the first to recognise the polity of such an arrangement.

It is by no means in connection with the boiler house only that pulverised coal firing has been developed. It is now turned to account in a number of metallurgical processes, in lime burning, in the treatment of fertiliser materials, and in galvanising and tinning processes. Perhaps the most fascinating of all its applications is, however, the possibility of fixing the gas derived from such fuel. Many attempts have been made to produce industrial or domestic gas from pulverised coal; and, though it is too early to speak with any assurance of the ultimate part which a process of the kind may be made to play, it can at least be said that a certain amount of success has been met with, and that further developments are now in hand. As many of our readers may be curious as to the principles upon which such processes are based it may be mentioned briefly that an ordinary producer is used as a generator, and into the hot zone at the top of the producer the pulverised coal is fed intermittently, so that the volatile constituents are driven off. This gas, which is of high illuminating and calorific power, is then brought down to a quality of some 400 B.Th.U. by the addition of water gas. The last named is produced in the ordinary manner by the application of steam to the bed of coke which has fallen down after the expulsion of the volatile matter from the original coal, the supply of pulverised fuel being shut off during the water gas cycle. Here at least is a process which must give the present-day advocates of complete gasification something to think about.

Chemical Research in India

THE lecture by Professor Jocelyn Thorpe at the Royal Society of Arts on "Chemical Research in India," deals with a subject which at first sight seems rather far away, but which is really of very direct interest to this country. The organisation of a chemical service for India has long been under consideration, and some kind of plan has been devised by which fundamental research shall be directed by a central body, while research of a more applied character shall be under provincial control. What will strike most readers of the lecture is the extent of India's natural resources, and the possibilities of establishing new chemical industries there. This may to some extent affect British or foreign firms which at present supply India's chemical needs, but in the long run it is good all round that the potential resources of the Empire should be developed, and any temporary disturbance of the balance of trade rarely fails to be rectified. The first of the good results of developing chemical industries in India on the basis of her own raw resources would be an improvement of industrial conditions for the people there, and the encouragement of native chemical studies. A second result would be an increased market for chemical works managers, who would naturally be drawn mainly from this country, and for chemical plant installations, the orders for which again would naturally come mainly to British firms.

The correspondence and inquiries we frequently receive from India indicate a very keen interest in chemical developments here on the part of Indian students, and a serious desire to raise their own standard of chemical education. This is a very desirable attitude on the part of native students, and from every point of view the friendly interest of British chemists in their problems—both academical and industrial—is to be commended. Professor Thorpe's paper is an excellent example of this sort of interest, and while it will be read with interest in India it will also enlighten chemists at home respecting important problems and developments which they would otherwise miss.

Qualifications for Gas Examiners

THE Institute of Chemistry and the Institute of Physics, in their interview at the Board of Trade last week, raised again the question of the qualifications of gas examiners appointed by local authorities. The Gas Regulations Act requires the appointment of a competent and impartial person as gas examiner, but provides no definition of the term "competent and impartial." The result is that each local authority can construe it as it thinks fit, and that there is great diversity between the appointments of the large and the small bodies. Sir Richard Gregory's view is that the gas examiner should be a person of similar standing to a public analyst, over whose appointment the Ministry of Health may exercise a veto, and that the Board of Trade should secure a similar right by means of statutory powers. Sir Charles Parsons made it clear that gas examination is by no means the casual process it is often supposed to be, but requires considerable technical qualifications.

While promising that the representations would receive the most careful consideration, the Board of Trade held out no hope of immediate compliance. The changes recommended involve the creation of statutory powers, and with several Bills overdue, the Board is not in a position to promise legislation, and even a promise to this effect would obviously have to be subject to conditions in Parliament. In addition, the local authorities affected would have to be consulted and it is probable that they would prefer their present unlimited discretion to regulations that must necessarily restrict their choice. However desirable, therefore, the recommendations may be in themselves, from the professional and public points of view, there is no immediate prospect of giving effect to them.

"Lime and Magnesia"

To the steadily lengthening list of chemical textbooks issued by Ernest Benn, Ltd., must now be added a valuable work by N. V. S. Knibbs, B.Sc., under the title of *Lime and Magnesia*, in which the chemistry, manufacture, and uses of the oxides, hydroxides, and carbonates of calcium and magnesium are treated comprehensively from the scientific and the practical sides (pp. 306. 30s.). As the author remarks, the lime industry, compared with others, has been rather neglected by technical writers and investigators, and too many manufacturers have been content to use antiquated and inefficient methods of manufacture. In America and elsewhere of late there has been a marked improvement in the attitude of both producers and consumers to the industry, but there is still much leeway to be made up. The magnesia industry, before the war almost entirely confined to Central Europe, is now an important one in many countries, and recent improvements in technique are fairly numerous. Moreover, it is closely allied to the lime industry, and advances in the latter are bound to affect the manufacture and uses of magnesia products. Mr. Knibbs modestly states that the book has been written in the hope of contributing something, however little, to the advance of these two industries. The reader's impression, we think, will be that he has contributed something of real value, which not only meets a present need but will stimulate further research.

Fellowships for Chemists

ATTENTION may be drawn to the announcement that the Salters' Institute of Industrial Chemistry is inviting applications for a limited number of Fellowships for post-graduate chemists who are desirous of adopting an industrial career. The Fellowships are of the annual value of £250 and they fall vacant in October next. Any chemists who contemplate applying may obtain the necessary forms from the Director of the Institute, Salters' Hall, St. Swithin's Lane, London, E.C.4, and the actual applications should be sent in to him on or before June 30.

Points from Our News Pages

Mr. E. Kilburn Scott reviews in an article the various types of catalyst bombs which have been introduced in connection with the production of synthetic ammonia (p. 482).

Professor Jocelyn Thorpe, lecturing before the Royal Society of Arts, dealt with the problems of organising chemical research in India (p. 484).

Mr. Sidney Webb received a deputation from the Federal Council of Pure and Applied Chemistry on Friday last week in connection with the proposed Anglo-German Dye Agreement (p. 487).

According to our London Market Report, there has been a fair amount of business passing, and values have been well maintained (p. 498).

Business in the Scottish chemical market during the past week is reported as having been decidedly more brisk (p. 501).

Books Received

CHEMISTRY IN THE TWENTIETH CENTURY. Prepared under the Guidance of a Committee representing the Scientific Societies with Dr. E. F. Armstrong as Chairman and Editor. London: Ernest Benn, Limited. Pp. 282. 15s.

PULVERISED COAL SYSTEMS IN AMERICA. Fuel Research Board—Special Report No. 1. By Leonard C. Harvey. London: H.M. Stationery Office. Pp. 132. 5s.

STUDIES IN BIO-CHEMISTRY. By Some Students of Dr. Gilbert J. Fowler. Bangalore: Indian Institute of Science. Pp. 198.

OILS, FATS, WAXES AND RESINS, ("Resources of the Empire" Series). By E. Richards Bolton and Russell G. Pelly. London: Ernest Benn, Ltd. Pp. 276. 21s.

CHEMISTRY OF THE RARER ELEMENTS. By B. Smith Hopkins. London: George G. Harrap and Co., Ltd. Pp. 376. 15s.

A DICTIONARY OF APPLIED CHEMISTRY. Vol. V. By Sir Edward Thorpe. London: Longmans, Green and Co. Pp. 722. 60s.

PRINCIPLES OF ELECTROPLATING AND ELECTROFORMING. By William Blum and George B. Hogaboom. London: McGraw-Hill Publishing Co., Ltd. Pp. 356. 20s.

The Calendar

May 12 to 23	British Industries Fair	Castle Bromwich, Birmingham
May 13	Institution of Petroleum Technologists: "The Geology and Oil Measures of South East Persia." R. K. Richardson. 5.30 p.m.	House of the Royal Society of Arts, John Street, Adelphi, London.
14	Institution of Sanitary Engineers: "Some Physico-Chemical Factors in Water and Sewage Purification." Dr. E. K. Rideal. 7.30 p.m.	Caxton Hall, Westminster, London.
15	British Chemical and Dyestuffs Traders' Association, Ltd. Luncheon 1 p.m. Annual General Meeting. 2.30 p.m.	Cannon Street Hotel, London
15	Chemical Society: Ordinary Meeting. 8 p.m.	Burlington House, Piccadilly, W.
15	Chemical Society: Papers by I. E. Balaban, F. L. Pyman, R. Campbell, W. N. Haworth, R. G. W. Norrish and E. K. Rideal. 8 p.m.	Burlington House, Piccadilly, London, W.1.
15	Royal Society: Election of Fellows. 4 p.m. Bakerian Lecture by Professor A. Fowler.	Burlington House, Piccadilly, London, W.1.

Catalyst Bombs for Synthetic Ammonia Production

By E. Kilburn Scott, M.Inst.E.E., A.M.Inst.C.E.

WHEN Professor Haber began to work on ammonia synthesis at 200 atmospheres he soon discovered that hydrogen would pass through ordinary steel and combine with the carbon to form methane, which then caused blisters; also that ammonia at high temperature tended to break down the crystalline structure by nitrification. Metallurgists at the Krupp works solved the problem by making a special tungsten steel in the electric furnace which had a very low percentage of carbon. The vessel or bomb is also lined inside with pure electrolytic iron and the walls are drilled with numerous small holes so as to allow any of the hydrogen that gets through to escape and not react with the carbon.

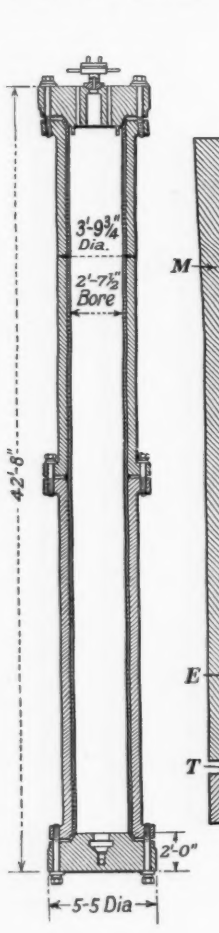

Fig. 1. HABER BOMB.

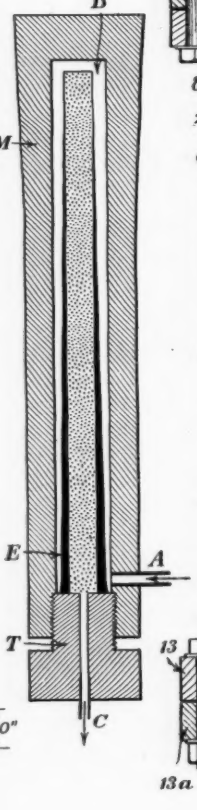

Fig. 2. CLAUDE BOMB.

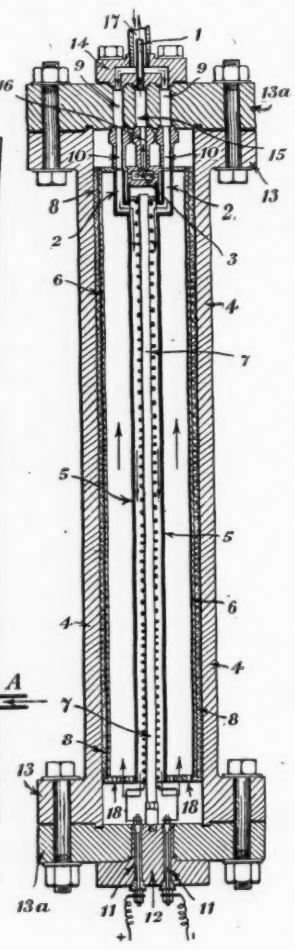

Fig. 3. CASALE BOMB.

Fig. 1 shows the Haber-Bosch catalyst bomb or vessel as used at Oppau. It consists of two forgings of tungsten steel each 19 ft. 7 in. long, 3 ft. 9 in. outside diameter, with a wall 7 in. thick. The end covers, 2 ft. thick, are fastened down by 15 tap bolts, each 4 in. diameter, and the flanges of the two halves of the vessel are also held in the same way. The total weight is 74½ tons. Inside the lining of electrolytic iron there is a layer of refractory material held by another liner, the rest of the space being occupied by the catalyst material, which consists of pure iron and a promoter. In order to conserve the heat of reaction the catalyst vessel is heavily lagged, and for the purpose of raising the temperature to 600° C. when first starting up, an electric resistance heater is employed. Starting up takes about three days.

The Oppau factory has 15 catalyser bombs each capable of producing 20 tons of ammonia per day, or a maximum output of about 250 tons a day. Each bomb takes about 12½ million cubic feet of nitrogen and hydrogen per day. The heat interchanger is of similar construction and is also made of tungsten steel. This is for lowering the temperature of the ammonia after it has been made by catalysis at 600° C., so that it can be removed by water absorption at a pressure of 200 atmospheres. Each absorber has three sets of spiral coils, water cooled, and the gases pass down the lowest spiral and then through the others in succession, whilst the absorbing water flows from top to bottom by gravity and scrubs out the ammonia as a 20 per cent. solution. The uncombined gases then pass again to the catalyst bomb and are kept in continuous circulation at 200 atmospheres pressure.

Claude Catalyst Bomb

The bombs used in the Claude plants at Montereau, Bethune, and elsewhere are shown in Fig. 2. The gases enter at A, travel up to B and down catalyst material, leaving at C with some of the gases combined as ammonia. E is the tube containing the catalyst, and M and T are made of nickel chrome alloy. The bomb is 7 ft. high, 9 in. outside diameter and 4 in. inside.

Vickers, Ltd., of Sheffield, who made some of the earliest bombs for M. Georges Claude to withstand 900 atmospheres pressure, employed a mixture of about 60 per cent. nickel, 25 per cent chromium, some cobalt, and only about 0.6 per cent. of carbon. This material costs about 4s. 6d. a lb. A nickel chrome alloy has great resistance to deformation at high temperatures, and the rate of flow is practically negligible at a stress of 8½ tons per square inch at 500° C.

The head of the bomb is fixed by an interrupted thread like that of the breech mechanism of a gun, which enables the catalyst material to be put in or taken out in eight minutes. The joint is made by a thin copper washer, and the head is screwed in by means of a wormwheel attached to the head, rotated by two worms geared to a crank. When the catalyst has to be changed a rotation of the movable head by a quarter of a revolution is sufficient. As the gases which enter at the bottom end of the tube are cold they assist materially in keeping the joint tight; also the gases cool the steel, and so it is the better able to withstand pressure. By the time the gases arrive at the top and are going to enter the tube of catalyst material they have reached about 500° C., which is the best temperature for such combination as ammonia.

A plant to make five tons of ammonia per day requires six bombs, each weighing 15 cwt., and therefore for an output of 20 tons per day there are 24 Claude bombs, which weigh 18 tons, as against the single bomb of the Haber-Bosch process, which weighs 74½ tons.

It is easy to remove the ammonia formed in the catalyst tubes when 900 atmospheres are employed, because in cooling the gases containing the ammonia to ordinary temperature a proportion of the ammonia liquefies out and is thus separated by gravity. The proportion depends upon the ratio of the vapour pressure of the ammonia to the total pressure of the gases.

In the Haber-Bosch process at 200 atmospheres it is necessary to inject water into the system to recover the ammonia as an aqueous solution, and this consumes a good deal of power and requires a complicated plant. If the ammonia is required in the anhydrous state the liquor has to be distilled.

With 900 atmospheres a simple cooling coil immersed in water is sufficient to liquefy all the ammonia save 2 or 3 per cent., and this small quantity is easily removed from the residual gases by further cooling produced by the vaporisation of part of the ammonia, or by absorption in sulphuric acid. After this removal the uncombined or residual gases from the last catalyst tube are returned to the system and go through the catalyser bomb again.

The advantages claimed by the Claude process at 900 atmospheres pressure over the Haber-Bosch process at 200 atmospheres are as follows:

1. The Claude process is a single operation at 900 atmospheres instead of a lengthy chain of operations of the Haber-

Bosch process at 200 atmospheres, which pressure has also to be maintained at each step.

2. With the Claude process there is spontaneous condensation of the ammonia formed in the circulating gas by means of ordinary cooling water at ordinary pressures. The Haber process, on the other hand, makes use of injected water at 200 atmospheres so as to ensure the re-entry of the circulating gases at that pressure and also to make good the loss of pressure in the ammonia towers.

3. Condensation of the ammonia in a liquid form, as in the Claude process, provides a valuable source of refrigeration for succeeding processes.

4. Evaporation of the ammonia to a gaseous form, which in the Haber-Bosch process constitutes an additional source of expense, is unnecessary with the Claude process, because the ammonia is in a liquid form and passes by itself to the gaseous state without distillation.

In several commercial plants Claude has demonstrated that with 100 cubic metres of gas per litre of capacity of the catalyser, and per hour, he can get 5 kilograms of ammonia per kilogram of catalyser material, instead of 0.5 kilograms obtained by the Haber-Bosch method at 200 atmospheres.

Casale Catalyst Bomb

Fig. 3 shows the bomb described in British Patent 176144 taken out in 1920 by Dr. L. Casale and R. Leprestre, of Rome.

There is an external tube (4), provided with flanged ends (13) and end plates. The catalyst material is placed between tubes 5 and 6, and 7 is an electrical resister for heating up the material when first starting up. Tube 6 is covered with a heat insulating lagging (8). The heat recovery apparatus consists of an internal tube (1) which has a thin wall and an external tube (17) having a thick wall which is screwed into flange (14). The mixture of gases enters through theannular space between tubes 1 and 17 and leaves in the opposite direction through tube 1, and in this way the cold gases become heated before entering the catalyst. The steel stopper (12) supports the tube of the heating resister (7), the electric conductors being marked 11. The gases enter the passage 17, pass through 9, 10 and 2 to the central tube containing the electrical resister (7), and thence pass through the perforated plates (18), through the catalyst material, through the holes 3 and passages 16 and 15 to pipe 1 of the heat-recovery apparatus.

Catalyst Material

In 1865 Charles Tellier made experiments on the synthesis of ammonia from its elements, and used iron as the catalyst. It has been used practically ever since in the form of wires or powder or in spongy condition, but mixed with promoters to increase the activity. These " promoters " may be metals of the iron group, alkaline earth or rare earth metals. Cerium oxide and chromium oxide have been used. Sulphur, phosphorus, silicon and arsenic act deleteriously upon the catalytic capacity of iron, and since commercial iron always contains these, it is necessary to make very pure iron. One method of doing this consists of oxidising iron in presence of oxygen till it is melted, then cooling the oxide and reducing it with hydrogen or nitrogen-hydrogen mixtures. By alternate oxidation and reduction an efficient catalytic iron can be obtained.

Another method consists in melting iron by means of a jet of oxygen, collecting the resultant molten material in a crucible made of refractory material, such as magnesia. Lime and a small quantity of alkaline oxide are added, and by the action of a jet of oxygen a great increase of temperature is obtained sufficient to dissolve some of the refractory material, whilst the molten mass is being stirred by the jet. The method used by Claude is something like this.

Dr. Luigi Casale describes a method of making a catalyst in British Patent 197199 as follows :—Iron is brought to a state of violent ebullition by means of oxygen under pressure, and, by causing about 10 per cent. of the oxidation product to be vaporised, impurities which are detrimental to catalysis are eliminated. He says it has been observed that the presence of alkaline earth oxides promotes the oxidation of the violently boiling iron or its alloys ; and, further, that the presence of metalloids, which sometimes occurs, promotes the operation by increasing the heat of the reaction, their elimination being almost complete after the first portion of the part to be vaporised has been removed.

It should be noted that the catalysts used for synthesising ammonia will serve equally well for the oxidation of carbon monoxide to the dioxide, or ammonia to nitric acid, or for preparing hydrogen from water and carbon monoxide. The passage of a water gas together with excess of superheated steam through a catalyst causes the following reaction to take place :—

$$CO+H_2O=CO_2+H_2$$

and as the original water gas contains about equal parts of carbon monoxide and hydrogen, the ammonia of the latter gas is doubled.

In 1918 the Research Division of the Chemical Warfare Service at Washington, D.C., developed the following method of making a catalyst for making hydrogen ;—A 6 per cent. ferric salt solution at 40° to 50° C. is poured into a slight excess of 5.8 per cent. ammonia solution which is at the same temperature. The mixture is stirred vigorously during precipitation, allowed to settle, and the supernatant solution siphoned off. The precipitate is then thoroughly washed by decantation, filtered, and introduced into a kneading machine, together with the desired promoters as oxides or nitrates. After thoroughly kneading, the material is again filtered to remove the solution expelled by the kneading, the filter cake broken into 1 in. cubes and dried in an air-ventilated oven at 80° to 90° C. for 12 hours, and then at 125° to 150° C. for 24 hours.

By this technique a catalyst was obtained so active that when a mixture of 1 part of water gas (50 per cent. CO) and 6.2 parts of steam passed over it at 1,000 space-velocity litres of gas per litre of catalyst per hour) the resulting gas after removal of the excess steam contained only 1.96 parts of carbon moxoxide and 98.04 parts of hydrogen.

Royal Institution Annual Meeting

THE annual meeting of the members of the Royal Institution, was held on Thursday, May 1, Sir James Crichton-Browne treasurer and vice president, in the chair.

The annual report of the Committee of Visitors for the year 1923, testifying to the continued prosperity and efficient management of the Institution, and the Report of the Davy Faraday Research Laboratory Committee were read ; 53 new Members were elected during the year and 63 lectures and 18 evening discourses delivered. The books and pamphlets presented amounted to about 154 volumes, making, with 480 volumes (including periodicals bound) purchased by the managers, a total of 634 volumes added to the Library in the year. Thanks were voted to the President, Tre asurer and Secretary, to the Committees of Managers and Visitors, and to the professors for their valuable services to the Institution during the past year.

The following were unanimously elected as Officers for the ensuing year :—*President*—The Duke of Northumberland. *Treasurer*—Sir James Crichton-Browne. *Secretary*—Sir Arthur Keith. *Managers*—Lord Blancsburgh, Sidney G. Brown, John Mitchell Bruce, Ernest Clarke, John Ambrose Fleming, Sir Robert Hadfield, Sir Alexander C. Mackenzie, Sir Alfred Mond, Sir Ernest Moon, Saxton W. A. Noble, Sir Charles Parsons, Sir Edward Pollock, Lord Rayleigh, Sir Robert Robertson, Sir Alfred Yarrow. *Visitors*—Sir Harry Baldwin, Alfred Carpmael, Ernest George Coker, Edward Dent, Frederick H. Glew, William J. Gow, W. E. Lawson Johnston, Vincent Warren Low, Ronald Malcolm, Percy St. Clair Matthey, Charles H. Merz, W. Rushton Parker, Major C. E. S. Phillips, Hugh Munro Ross, John Tennant.

Petroleum Products from Slime

THE Research Organisation of the Russian Soviet Government have been investigating the possibility of obtaining oils and other products from the slime found at the bottom of the lakes of Central Russia and Turkestan. It is stated that they have been successful in distilling virtually every product usually associated with mineral oil deposits. Assuming that this is substantiated, it will be strong confirmatory evidence for the organic theory of the origin of petroleum deposits ; though the commercial value of the discovery would appear to be but small.

Organisation of Chemical Research in India

A Lecture by Professor Jocelyn F. Thorpe

At a meeting of the Indian Section of the Royal Society of Arts in London, on Friday, May 2, a paper on "Chemical Research in India" was read by Professor Jocelyn F. Thorpe, F.R.S., Professor of Organic Chemistry, Imperial College of Science and Technology.

Sir Thomas Holland, F.R.S., who presided, introducing the lecturer, said the paper represented a piece of research undertaken by Professor Thorpe during a tour which he made in India in connection with the organisation of chemical research there.

The Report of the Industrial Commission

Professor Thorpe said the Indian Industrial Commission, presided over by Sir Thomas Holland, which issued its report in 1918, was "instructed to examine and report upon the possibilities of further industrial development in India, and to submit its recommendations" with special reference to a number of specific questions. One of the first effects given to the report was to appoint a committee with instructions to "formulate proposals for the re-organisation of a Chemical Service for India and for the location and equipment of research laboratories." He was asked to act as Chairman of this committee, and he toured India during November and December of 1919 and January and February of 1920. One of the chief objects in view, besides ascertaining the best conditions for the establishment of the chemical service, was to find whether such a service could be expected to become self-contained, from the Indian point of view, in the near future, for, although it was evident that a start would have to be made with an admixture of chemists possessing a European training, it was hoped that in the course of a few years the methods of scientific training carried out in the Indian Universities would have so far improved as to render it possible for them to supply an adequate number of fully qualified Indians for recruitment into the service. India was at present poorly equipped to meet any demand for properly trained chemists, and could not be expected to supply recruits for a chemical service unless the service itself could act as the research trainer. Nevertheless, it was possible that the Indian Institute of Science at Bangalore might, under the new regime, revert to its original purpose, and become the centre of research training in India. The Institute was originally projected by the late Mr. J. N. Tata with the object of encouraging post-graduate research in pure physical science, and, with this object in view, it was designed and equipped under the auspices of the late Sir William Ramsay. On visiting the Institute at Christmas, 1919, it was evident that the research work being carried on was mainly of a commercial character, and the original intention of the founder was not being carried out. Recently, a committee, under the chairmanship of Sir William Pope, had framed a scheme for the re-organisation of the Institute, and there was every reason to believe that, if the new organisation was found to be successful in practice, the Institute would become of real use to the Indian Empire, and would be of the greatest value in the development of several of the scientific services proposed by the Industrial Commission.

A Central Research Institute

The general scheme outlined in the report of the Industrial Commission for the establishment of a chemical service provided for the formation of a central research institute under the Government of India. The suggested organisation was given in the following paragraphs quoted from the report:

"Taking chemistry first, it would be possible, for administrative purposes, to divide the chemists into three fairly compact groups, which might be called (*a*) agricultural, (*b*) organic, and (*c*) mineral chemists. In many ways the agricultural and the organic chemists would overlap, as many of the problems of agricultural chemistry are organic in character. It is desirable, however, in a country such as India, where agriculture is so extremely important, to give this branch of chemistry special consideration. The organic chemists would be occupied largely with problems connected with forest products, drugs, perfumes, essential oils and dyes, leather, and sugar. Many of these officers would be eligible to officiate in the agricultural group. The mineral chemists would include metallurgists, the metallurgical inspectors and the chemists of the mints and geological survey. At some laboratory recognised as the headquarters of the service there would be at least one chemist who has specialised in physical chemistry, for a chemist of this type would deal with the physical problems connected with both the inorganic and organic substances. It seems to us that Dehra Dun possesses many advantages as a site for the headquarters of this, as well as of other scientific services. The whole of the chemists would be under the control, for scientific purposes, of a senior officer, who might appropriately be called the Chief Chemist to the Government of India. Under him directly would be the staff of the headquarters laboratory, including the physical chemists and the specialists not assigned to provincial branches. The other three groups would be under the supervision of three Deputy Chief Chemists. Junior members of any of the three groups would be lent to local Governments and the principal Government Departments for terms normally limited to five years. They would carry on the routine duties required, in some cases including teaching, and would undertake certain forms of research with the approval of the head of their service. All the results of scientific and practical value would be published in a serial recognised as the authoritative publication of the Indian Chemical Service. Such a serial would quickly establish its position in the scientific world, and would become a convenient medium for the publication also of papers by private chemists, resulting in the formation of an Indian School. At convenient intervals, most or all of the chemists might assemble for a week's conference, which should be open also to manufacturing and private chemists."

The Feeling of the Provinces

It was evident, however, continued Professor Thorpe, that the provinces would have nothing to do with such a scheme. They recognised the necessity for scientific investigation into the conditions underlying their existing industries, and were fully aware that many of their natural resources remained undeveloped and could only be developed through the agency of scientific research, but they wished to do these things on their own behalf, unhampered by any restrictions of a central Government institution. Still, a modified scheme by which each Province would have its own research institute seemed practicable and, indeed, even an improvement on the original idea, provided that each provincial institute undertook to confine its activities, both fundamental and practical, to its own local immediate industrial needs, leaving a central institute under the Government to carry out those fundamental researches which underlay the industries of the country as a whole. A modified and extended scheme of this kind, therefore, was recommended by Professor Thorpe's Committee. The scheme would not in any way prevent manufacturers from carrying out "secret" research on problems connected with their own products, because this would be done in their own laboratories by their own chemists.

Central and Provincial Institutes

In the Central Imperial Institute, organised research of a fundamental character would be carried out. Much of this would arise during the operations conducted at the provincial institutes, and would be referred by them to the central research institute. It would be one of the chief duties of the Central Imperial Institute to survey the industrial possibilities of the Empire generally, and to initiate research having for its object the establishment of new industries in different parts of the country. Thus the scheme suggested provided for the establishment of two very similar types of institution. One type, situated in each of the most suitable provincial centres, would be essentially practical in outlook. The other, situated at some convenient central place—the recommendation of Dehra Dun for this purpose by the Industrial Commission was endorsed by Professor Thorpe's Committee—would conduct research mainly fundamental in character, but would, nevertheless, deal in certain cases with investigations involving the practical establishment of a new industry.

Selecting the Right Men

Speaking of the training necessary for the men who would be engaged, Professor Thorpe said that no university or technological system of training could be expected to discriminate between the men who were best fitted to act as leaders of research and those who were fitted by natural characteristics and temperament to be leaders in the conduct of works practice. It was essential, where chemical manufactures were concerned, that each type of man should have received the same grounding, and this was adequately effected by a system involving a course of instruction up to the honours graduation stage, followed by a training in research methods, the latter serving to impart the feeling of self-reliance and patience essential to success in a chemical worker, which could not be obtained otherwise. The final problem was how to supply the training in works practice, and what was still more important how to pick out men most suited by temperament to profit by this training which had to be solved not only in India but in this country also. It was of no advantage to label students chemical engineers or engineering chemists, because such terms not only helped to accentuate the supposed difference between a " pure " and an " applied " chemist, but lent colour to the view that any such hybrid had an actual existence in fact. Chemical engineers were usually engineers masquerading as chemists, rarely chemists pretending to be engineers.

The proposals implied that besides the main chemical staff each institute would have to be provided with a suitable staff of engineers, whose main duty would be to act as instructors in general engineering practice. It was not considered necessary that the chemists forming the service should possess more than a working knowledge of engineering. A complete knowledge of both engineering and chemistry, desirable though it undoubtedly was, would be impossible of attainment in the time an ordinary individual could devote to his education.

The proposed scheme for the establishment of a chemical service would have to start in a small way, and, no doubt, in many of the provinces use could be made of some existing institute to act as provincial research institute until funds were available for the erection of a building especially designed for the purpose. The chief initial cost would be incurred by the erection and equipment of the new Imperial Research Institute at Dehra Dun, but it was understood that some of the money, at any rate, had been allotted for this purpose. No doubt a considerable annual income would be ultimately obtained by the sale of new processes and improved methods of manufacture to firms and syndicates, and this amount would be set against the annual cost of each institute.

Mineral Possibilities

The nature and extent of the mineral deposits of India had been systematically examined by the Geological Survey, but except in very special cases the survey had not been carried out to a point which would warrant commercial exploitation. It would be one of the first duties of the proposed chemical service to carry out, in conjunction with the geologists, a thorough survey of the possibilities underlying the commercial exploitation of several mineral deposits. India was by no means deficient in the raw material necessary for the production of the essential heavy chemicals, sulphuric, nitric, and hydrochloric acids, and caustic alkali. It was true that sulphur did not occur native, but a wide source of this element existed in the zinc blende mines of Burma, which had not, however, yet been exploited for this purpose. Sodium chloride and nitrate were abundant, and no doubt the electric power schemes which were now being developed in southern India and elsewhere would lend themselves in due course for the preparation of nitrogenous products from atmospheric nitrogen. The salt deposits of the Kharagoda district, north of Bombay, which had recently been analysed, indicated a possible source of potassium and bromine which should clearly be explored. The chemical products were of great variety and extent, and would well repay the cost of a staff of investigators many times the size of that at present at work for instance in the Forest Department. Already much had been done both as regards commercial exploitation and scientific research, the former being illustrated by the resin and turpentine factory at Jallo, and the latter by the recent discovery of carene in the turpentine oil derived from the *Pinus Longifolius* by Simonsen. But the possibilities of further development were enormous, and included the search for and extraction of plant alkaloids, the utilisation of the forest grasses for fermentation purposes, and the commercial exploitation of the vast number of essential oils. These problems required the services of a number of specialists for their solution, and it was only by means of a chemical service that such specialists could be supplied. The chief source of coal occurred in Bengal and Bihar, but only about 5 per cent. of the yearly output was available, however, for use as coke, and therefore for the preparation of by-products.

Discussion on the Paper

Sir Thomas Holland in opening the discussion said that although there were three times as many chemists employed by the Government in India as there were geologists, the degree of the lack of organisation in chemical research in India was emphasised by the fact that whereas the geologists had published some 150 volumes of valuable papers, the published work of the chemists was practically negligible. The importance could not be over-rated of the need for a chemical survey of the many raw materials that we possess in abundance in India. Such a survey could not be done systematically by any individual or any firm. It was the duty of the Central Government.

Professor H. E. Armstrong referred to the failure of the Government's efforts to secure the rehabilitation of indigo in India, and suggested that the problem of the organisation of chemical research would prove more difficult. It was very largely a question of getting the right type of man to start it, and then there was the doubt whether the Indian mind had the same aptitude for science as the Westerner's.

Professor W. A. Bone agreed with Professor Armstrong as to the necessity of having the right type of man to start such a scheme, but it seemed to him doubtful whether there were sufficient inducements to get men of the right type to go out to India to organise this kind of work.

Professor J. W. Hinchley said that Professor Thorpe's outline of the scheme made one wish that we could have some more organised chemical service in this country. He objected to Professor Thorpe's remarks as to the chemical engineer, and said that the lack of good chemical engineers in this country was largely the fault of the existing educational arrangements.

Sir Arthur Chatterton, as a member of the Indian Industrial Commission and as an engineer who has met a considerable number of Indian trained chemists, paid a tribute to the work which these chemists had done under difficult circumstances.

Dr. A. Voelcker said that when he was in India 34 years ago there was not an agricultural chemist in the country and but one or two experimental stations. Now there was a chemist in every agricultural province, and instead of one or two experimental stations there were 161, and a very large number of workers in agricultural science from the purely chemical side.

Sir Robert Robertson said he had spent two or three months in India in a factory on the top of the Nilgiri Hills during the war, and had been struck by the fact that everything had to be brought from a great distance: sodium nitrate from Chili, acetone from Canada, sulphur from Italy, and glycerin and cotton from England, and all these materials were worked up in a factory in charge of Englishmen into propellants. Since then certain advances had been made in regard to Indian production which obviated the totally unnecessary importation, for instance, of cotton, the waste from the Bombay mills now being used. There was an enormous field for the development, within India itself, of a large number of the raw materials now imported, and he was certain that Professor Thorpe's report was on the right lines.

Professor Thorpe, in reply to the discussion, said that twenty or thirty Indian students had passed through his hands, and from his knowledge of them he did not think that there was any reason why, within a reasonable period, if the University developed the research sense, the chemical service referred to in the paper should not be maintained from India alone.

Glycerin Manufacture in Italy.

ITALIAN soap manufacturers have been asked by the Government to make glycerin from their spent lyes which are now going to waste, according to reports. Italy at the present time is importing glycerin from this country and the United States.

The British Empire Exhibition

Chemical Notes and News

ANOTHER week has seen some improvements in the Chemical Section at the British Empire Exhibition. The stand of the British Dyestuffs Corporation is finished, so that now the few remaining uncompleted stands are only those hidden away in comparatively obscure corners, and the frontage on the main avenue presents a satisfactory appearance. There are a few finishing touches needed even here, but on Monday the Erasmic soap people started their foaming fountain of soap lather, and we fancy that a similar looking erection outside the Brunner Mond exhibit will shortly be in operation on some equally effective lines. The fiery fountain in the Scientific Section is still in the hands of the artists, but the " works " of this are evidently installed, to judge from the electrical gear we detected attached to part of the erection. The fact that these " flashy " displays are now in operation shows that the power difficulty is being overcome, and in addition the stands have at last been connected with the electricity supply mains, so that the effectiveness of many of the exhibits has been increased by illumination. Apart from these overdue improvements there are many more visitors about in the Chemical Hall, and there is more life generally, a certain air of deadness which was apparent a week ago having entirely disappeared. There is, however, among the exhibitors still a feeling that some of the organisation is still not what it should be. The Post Office, apparently, has made no attempt to deliver letters, there being numerous instances of letters addressed to firms at their various stands which have not been received.

A Royal Visit

On Friday, last week, the King and Queen, accompanied by the Duke and Duchess of York, paid an informal visit to the Exhibition. After visiting the Palace of Engineering they made a tour of the Palace of Industry, including the Chemical Hall. The Royal Party was received at one of the entrances and conducted through the Hall by the General Manager of the Association of British Chemical Manufacturers. They spent some time in the Scientific Section, where the interesting exhibits by Sir John Russell, representing Agriculture, and by Sir Robert Robertson, showing Explosives, were noted. A copy of *Chemistry in the XX Century* caught the attention of the King who had previously accepted a specially-bound copy for his own library. Some ancient Egyptian dyed fabrics were also displayed and, as a companion exhibit, the original specimen of mauve, the historic discovery of the late Sir William Perkin. The visitors were also interested in the display of ancient appliances for producing fire before the days of matches, shown in the cottage of Messrs. Bryant and May. The crystals shown by Peter Spence and Co., also were noticed as well as the puppets on the Stand of Messrs. Yardley. Before leaving, the King and Queen expressed to Mr. Woolcock their pleasure at what had been shown them.

The British Government Exhibits

The visitor desiring to see the Chemical Section is well advised to go to the Exhibition by way of Wembley Park Station on the Metropolitan Railway, which, incidentally, is running an astonishingly frequent service of express trains from Baker Street. If, however, a start is made from Marylebone (L. & N.E.R. Great Central Section), one finds also an excellent service of trains to a station actually inside the Exhibition grounds. This position is very central and particularly convenient for reaching the British Government Pavilion, which is reached by crossing " Old London Bridge."

In the Government Pavilion, which is a singularly effective structure architecturally, are the official exhibits of various Government departments and related organisations. Thus the Government Chemist (Sir Robert Robertson) has various exhibits, including one showing the paint testing apparatus used in the laboratory, by which samples of painted surfaces are submitted to artificial weathering conditions. In addition, there is an exhibit showing the actual apparatus used to determine the percentage of helium in natural gas, and in another case there are some specimens illustrating work which has been carried out on the condition of oysters at different times of the year, showing that in winter there is a higher percentage of glycogen in the fat.

The Ministry of Health, the Imperial Institute, the Imperial Mineral Resources Bureau, and the Fuel Research Board, are among the other departments which have exhibits in the building likely to be of interest to chemists. The Royal Society, at the request of the Government, has organised a series of exhibits illustrating the progress made in pure science. Though on somewhat similar lines to the section in the Chemical Hall arranged by the Association of British Chemical Manufacturers in conjunction with the Royal Society, this exhibit is less detailed and broader in its scope, as it covers botany, astronomy, meteorology, etc., and not merely chemical matters. Another exhibit of great interest in the Government building is a number of photographs and examples illustrating the progress made in fighting tropical diseases.

Chemistry Everywhere

It is surprising to notice in how many directions some chemical interest is to be found. In such apparently widely separated sections as the Australian Building and the Jewellery Exhibit there is something to be seen closely connected with the chemical industry. In the case of Australia this is the display of mineral resources, showing the ores of gold, iron, zinc, lead, etc., and in particular the flow sheets of the Broken Hill mines for the production of electrolytic zinc. In the Jewellery Section of the Palace of Industry a number of firms have stands displaying precious stones and metals, and among their number are Johnson Matthey and Co., Ltd., who have an exhibit of gold, platinum and silver goods, including some wonderfully elaborate chemical apparatus, such as stills or taps, carried out in platinum and silver for analytical or research work with substances which attack glass vessels.

Steam Raising at the Power House

The idea, which has been carried out in the Palace of Engineering, of making the Power House for the Exhibition actually open to the public view, is probably unique. The installation of the boilers for the Power House has been divided between two firms, each supplying two boilers. One of the firms is Babcock and Wilcox, Ltd., whose exhibit and arrangements have already been described, the other being John Thompson Water Tube Boilers, Ltd., of Wolverhampton. This firm has adopted two water-tube boilers with vertical straight tubes, and fitted with " John Thompson " expanded tube superheaters and electrically-driven mechanical chain grate stokers. The boilers are designed for 350 lb. pressure, but are actually run at 225 lb. only, and have been very completely fitted up with gauges, safety valves, high and low water whistle alarms, etc., by Blakeborough and Co., of Brighouse.

A " Kennicott " water softener deals with all the water used in the boilers at the Power House. This is capable of dealing with 1,000 gallons per hour, and the softening tank holds 3,300 gallons of water, so that fully 3 hours may be allowed for the removal of the hardness. The water entering the apparatus passes first over a water-wheel which is used to operate some of the moving parts, and ensures that in the event of any stoppage of the water supply the addition of lime sludge is automatically stopped. By means of a simple arrangement of floats, on restarting the water supply the hard water is stored for a period while the automatic gear stirs up the lime sludge, filtered soft water being available meanwhile from the reservoir. It will be seen from these notes that the steam raising installation of the Power House is on the most up-to-date approved lines, and this is true also of the engines and electrical equipment.

A Correction

Our attention has been called to the fact that in a note referring to the exhibit of Baird and Tatlock (London), Ltd., at the British Empire Exhibition, the firm were described as Baird and Tatlock, Ltd. " The name of our firm " we are asked to state, " is Baird and Tatlock (London), Ltd., and much confusion is caused, as there is a firm of Baird and Tatlock, Ltd., in Glasgow, with branches in Manchester and Liverpool, but with whom we have no connection. Perhaps you will be good enough to insert a disclaimer in your paper putting the matter right."

Fertilisers and Soil Acidity

To the Editor of THE CHEMICAL AGE.

SIR,—I have just been reading the article under the heading "Fertilisers and Soil Acidity" in your issue of May 3, on page 457, in which you allude to the fact that the use of sulphate of ammonia might add to the acidity of the soil. Are you not overlooking the fact that the neutral sulphate of ammonia is now guaranteed to the farmer that it does not contain free acid exceeding in amount ·025 per cent. Of course, I am now speaking of the neutral quality, and for one ton we sell of the old-fashioned sulphate we sell practically 50 tons of the neutral.

Surely the writer of the article in question has omitted to take notice of this fact. We know of works that formerly made nothing but the old-fashioned acid sulphate who now do not make a single ton of this, and are entirely given up to the making of the neutral quality.

Of course this article costs the buyer 13s. per ton extra, but it is well spent money. Not only is it free from acid, but it is practically now in perfect condition for sowing, whereas the old-fashioned quality had to be disintegrated before the farmer could apply it to the land, and then he could only apply it when mixed with something else to make it sow evenly.—Yours, etc.

THOMAS DARLING. F.C.S.

Berwick-on-Tweed,
May 6.

[We are only too pleased to give prominence to our correspondent's remarks which reiterate the opinions we ourselves have so often expressed in connection with the advances made in recent years in the quality of sulphate of ammonia. We think that he has, perhaps, misconstrued our remarks, which were merely intended to draw attention to a means for precluding acidity if it *should* occur.—ED. "C.A."]

Disposal of Government Stocks

To the Editor of THE CHEMICAL AGE.

SIR,—Recently considerable publicity was given in the Press to a function which marked the termination of the late Disposal and Liquidation Commission. Since that date references to that event have been made, and it would appear that an erroneous impression has been created in the minds of the public generally in that they have concluded that the whole of the Government surplus stocks have been liquidated.

There is in fact a large and valuable stock of machinery, etc., remaining for disposal, for the sale of which we were by special contract in June last appointed agents to the Government. Whilst we have already realised a large proportion of that stock we have yet millions of pounds worth of extremely useful stores of almost every description still to be sold on behalf of the Government.

In the interest of the public it is most desirable that these facts be brought to their notice, since the revenue obtained from the sale of these surplus stores is a contribution to the National Exchequer.—We are, etc.,

GEORGE COHEN AND ARMSTRONG DISPOSAL CORPORATION.
ALFRED W. BEUTTELL,
Abbey House, 2, Victoria St., S.W.1. General Manager.

Sulphuric Acid Plant

To the Editor of THE CHEMICAL AGE.

SIR,—I have read with much interest the summary of the lecture by Mr. Parrish on "Sulphuric Acid Plants—Old and New"—as reported in your issue of March 29 and also the subsequent correspondence appearing in your issues of April 5 and 19.

It struck me that Mr. Parrish's references and those of other contributors on the subject of mechanical furnaces in the manufacture of sulphuric acid were liable to leave readers with the impression that there existed no such furnaces in commercial use capable of avoiding the severe obstacle of dust.

With your permission I should like to dispose of this impression by stating that such a furnace does exist, and is so effective that it is operated even without employing dust-arresting devices. The advantages of elimination, both of dust and of dust-chambers, are too obvious to sulphuric acid burners to call for comment here.

Some time ago, together with Mr. Charles H. Stewart of the firm of Alex. Hill and Stewart, I investigated the action of these furnaces, the Bracq-Laurent furnaces, and learnt that their efficiency, not only from the standpoint of complete elimination of dust, but also from that of first cost, operating cost, power consumption, desulphurisation, and duty, compares most favourably with other mechanical furnaces. Alone from the point of view of dust, this means that the factor influencing many English plants to deal as far as possible with lump ores and avoiding fines no longer exists.

This Bracq-Laurent furnace is extensively employed in France, where its operations have definitely proved the existence of all the advantages ascribed to it. Others have been erected in this country during the last eighteen months and have already demonstrated what was expected of them.

The principle is that of a spiral or helicoidal hearth, with rabble-arms following the bed with a peculiar raking motion, whereby the ore is subjected neither to a sudden drop nor to caking, and the gases pass uniformly over the whole width of the ore. The mechanism is perfectly simple and can be regulated instantly by the attendant to increase or decrease the mixing of the charge, to vary the period and extent of oxidation, to elevate or lower the rabbles, etc.

So far, the use of this furnace has been confined to pyrites burning. Its suitability to the treatment of spent oxide has not yet been explored, but with adaptation in the way of speeds, draught, etc., there seems no reason why it should not be equally satisfactory.—I am, etc.

87, Cannon Street, E.C.4. J. CROSS BROWN.
May 6.

Anglo-German Dye Combine

Chemical Deputation to Board of Trade

MR. SIDNEY WEBB, the President of the Board of Trade, on Tuesday received a deputation from the Federal Council for Pure and Applied Chemistry to discuss the position of the Dyestuffs Industry; Sir Sydney Chapman, Mr. Percy Ashley and Major Church, M.P., were also present.

Chemical Professors' Views

Sir William Pope introduced the deputation, which included Professor W. P. Wynne, the President of the Chemical Society; Professor H. E. Armstrong, a past President of the Chemical Society; Professor J. F. Thorpe, Honorary Treasurer of the Chemical Society; Mr. H. E. Coley, Chairman of the Chemical Industry Club; and Dr. Stephen Miall, Honorary Secretary of the Federal Council. He explained that the Federal Council consisted of representatives from the Chemical Society, the Society of Chemical Industry, the Association of British Chemical Manufacturers, and all the other organisations connected with English chemistry. He urged that the dyestuffs industry was essential to the progress of organic chemistry, including pharmaceutical and many other branches; that the progress of research in organic chemistry was inseparable from research in the dyestuffs industry, and that no steps should be taken which would allow the control of advance to revert to German hands. He pleaded that any arrangements made between the British Dyestuffs Corporation and the German Interessen-Gemeinschaft should respect the original intention of making the dyestuffs industry here free from German influence or domination.

Professor W. P. Wynne referred to the great development of chemical research which had taken place in this country, especially in organic chemistry, during the last few years, and stated that if German discoveries in dyestuffs were to be relied upon for the British dyestuffs industry an avenue would be closed to a number of highly trained and efficient chemists.

Professor H. E. Armstrong said that whereas formerly it was necessary for a chemist to receive training in research in Germany, it was now possible for him to acquire as good or even better training in this country; that it was essential to attract into chemistry men of ability who could advance a science which was of great importance to every manufacturing industry, to agriculture, and medicine, and that every possible encouragement should be given to the promotion of chemistry here. He discussed the serious effect on the natural indigo industry of India caused by the cessation of research in this industry.

Mr. Sidney Webb, in replying, stated that the matter was one in which politics played no part. All were agreed as to the purpose: it was the process of carrying this out which was difficult. The present Government—and, indeed, all

Governments—recognised the necessity of promoting scientific research and supplying opportunities and freedom for carrying it on. He was convinced that the research work in the dyestuffs industry should be done here by British-trained chemists, but the method of securing this was not easy. As regards the proposed agreement, he pointed out that the Government was not a party to the negotiations, but he was sure that no agreement would be concluded which was not consistent with the original purpose of the British Dyestuffs Corporation. He agreed that there could be no monopoly in research in this industry, and he realised that the dyestuffs industry was essential to the progress of chemistry as a whole. He hoped that what he said would to some extent reassure the deputation, and that the Federal Council would continue to communicate with the Board of Trade on this or any other chemical topic.

Sir William Pope thanked the President of the Board of Trade for receiving the deputation and for his sympathy with their views.

Qualifications for Gas Examiners

Deputation to Board of Trade

In the unavoidable absence of the President of the Board of Trade, Mr. Alexander, Parliamentary Secretary, received a deputation from the Institutes of Chemistry and Physics at the Board of Trade on Thursday, May 1, in connection with the qualifications of gas examiners appointed by local authorities for the purpose of protecting the interests of the public users of gas supplies. The deputation was introduced by Major Church, Parliamentary Private Secretary, and consisted of Sir Richard Gregory, Sir Herbert Jackson, Sir Charles Parsons, Mr. E. M. Hawkins, Mr. G. Nevill Huntly, Professor Eccles, and the officers of the Institutes of Chemistry and Physics.

Sir Richard Gregory, in stating the case, said that by the Gas Regulations Act, 1920, the price of gas was made to bear a definite relation to the quality and not merely to the quantity of gas purchased. For this purpose the Gas Regulations Act required the appointment of a competent and impartial person to be a gas examiner. It was necessary to emphasise the importance of defining the phrase "competent and impartial person," as the section of the Act which related to the powers of the gas referees did not require them to define competency, and there was no reference in any part of the Act to such a definition. The result was that the practice of local authorities with regard to the appointment of gas examiners varied considerably. As a general rule, the authorities in the metropolitan area and large provincial cities secured for their gas examiners highly competent persons; but small local authorities, particularly in rural areas, regarded with some disfavour expenditure on this kind of service; the protection to the public from small local gas companies, often not too efficiently directed, was correspondingly reduced. He claimed that the gas examiner should be a person of similar standing to a public analyst, over whose appointment the Ministry of Health could exercise a veto, and suggested that the Board of Trade should secure this right under statutory powers. In his opinion, the higher the standing of the gas examiner and the stronger the corporate body to which he belonged, the more adequately were the public safeguarded.

Sir Herbert Jackson pointed out that the chief concern of the Institute of Chemistry, the Institute of Physics, and similar professional bodies in matters of this kind was to safeguard the interests of the public. Properly qualified professional men had behind them the traditions and status of their institutions and were sensible of the grave responsibilities of their duties, and answerable to their professional institutions for their conduct.

Interesting examples were given by Mr. Hawkins and Mr. Huntly of the manner in which incompetent gas examiners might fail to detect irregularities by which the public might suffer loss.

Sir Charles Parsons pointed out that in the case of gas examination no simple fool-proof instruments existed, as in the case of the measurement of electrical units. It was not until he was associated with Sir George Beilby at the Fuel Research Board that he realised how difficult was the task of carrying out the test with gas calorimeters; and it was only recently that he had been made acquainted with the fact that in some places incompetent people were being employed as gas examiners. Like the other speakers, he insisted that gas examiners should be persons of high professional qualifications and standing.

Mr. Marlow, Assistant Secretary of the Institute of Chemistry, in summing up, said that the case of the Institutes was that the word "competence" in the Act required definition. The point would be met if the Board secured the necessary statutory powers to issue orders defining "competence."

In reply, Mr. Alexander said that the Board were most anxious to protect the public, and that the representations of the deputation would receive the most careful consideration of the President and the officers of the Board. The change in the method of appointment of gas examiners suggested by the deputation indicated the necessity for statutory powers being granted by Parliament. He was certainly not in the position to promise legislation this Session, as there were many important and overdue Bills on the stocks. He pointed out also that the Board must work in harmony with the local authorities, and that in the event of legislation being contemplated the local authorities would have to be consulted.

The deputation thanked Mr. Alexander for their reception.

British Industries Fair

To be Opened Next Week at Birmingham

The British Industries Fair (Birmingham Section) will be opened at Castle Bromwich on Monday, May 12, and will be continued until May 23. The display shows a falling off on Fairs in recent years, owing to the fact that several important firms are restricting their exhibits to Wembley. Nevertheless the catalogue contains a fairly large number of new names, and it is already apparent that machinery in motion will be more in evidence than usual.

The members of the council of the Birmingham Exhibition were invited by the Board of Trade to the Government luncheon at the White City on Monday, and they had the honour of being presented to Their Majesties. Those who accepted the invitation to be present were the Lord Mayor (Alderman T. O. Williams), who is the patron of the Birmingham Fair; Mr. H. Lakin-Smith (President of the Council), Mr. Gilbert C. Vyle, Mr. John Belliss, Mr. J. Percy Plant, Mr. A. B. Wood, Mr. J. P. Achurch, Mr. F. Hilary Jones, Mr. G. Henry Wright (Secretary), and Mr. Charles Stanley (General Manager).

The advices received in Birmingham indicate that the buyers from overseas, and particularly from the Colonies, will be in excess of previous years.

The Board of Trade is again giving its support to the Birmingham Fair, and Sir William Clarke and Colonel Cole, from that department, have intimated their intention of visiting Castle Bromwich.

The Birmingham Fair, which will be contained in two large aerodromes, plus a huge connecting corridor, will, as in previous years, be represented by the following groups:—Brassfoundry, hardware and ironmongery; metals; construction building and decoration; power, lighting, heating, cooking and ventilating; engineering; agriculture; mining; motors, motor cycles and cycles, cycle accessories and perambulators; guns, saddlery and harness, and fishing tackle; brewing, distilling and catering, and services. In the decoration group, paints, colours, enamels and varnishes and the like are included.

New Cambridge Laboratory

On Friday a new bio-chemical laboratory was formally opened at Cambridge by Earl Balfour, Chancellor of the University. This laboratory is to be under the direction of Professor F. Gowland Hopkins, F.R.S. The funds for building, staffing, and equipping the laboratory, and also for carrying on research in it, are due to the generosity of the trustees of the late Sir William Dunn, the executors under whose will are the directors of the Commercial Union Assurance Company. Of these a committee, with Sir Jeremiah Colman as chairman, having investigated the claims of various branches of science, decided that study and research in bio-chemistry would be of the greatest service to mankind, and determined to make a grant to Cambridge University for that purpose.

The World at a Standstill

Social Betterment and How It may be Obtained

By Sir Ernest Benn

In an age which seems to be exceptionally full of difficulty, uncertainty and unrest, one bright gleam is observable. Everybody wants to put the world right; and this widespread desire to end chaotic conditions and turmoil and get back to order and tranquillity is the really hopeful factor in the situation. If the ills that beset us to-day are regarded as an undesirable legacy of the War, the European upheaval can at least be credited with having opened up a store of enthusiasm for social betterment. One of the big problems now confronting us, and one upon which we need to concentrate, is how to use the fund of enthusiasm for social amelioration that is available for good. If the commendable ambition to set the world right, which is held by people in all walks of life, can be turned in a constructive direction and fortified by practical experience, then we cannot fail to attain better conditions.

The business man who takes a survey of the situation as a whole is inclined to experience a sense of hopelessness and despondency which is understandable, perhaps, but which is nevertheless regrettable. What does he see? A world full of wants which we know how to supply—we have a productive capacity equal to providing everybody with their reasonable requirements—yet, for some reason that nobody is quite able to define, the world and the people in it are standing still. There is no forward movement, no progression. Indeed during the past few years there has been a tendency in the opposite direction. We spent the last century, a period commonly called the industrial revolution, in finding out how to do things, and we have spent the first quarter of the present century in preventing those things being done by setting up innumerable barriers and restrictions and controls.

Politics were regarded 25 years ago as a pastime for one's leisure hours. There were no politics in business; it was an offence against good manners to talk politics with business associates. In those days politics were concerned almost exclusively with questions like education, religious instruction, the franchise, the development of the Empire, the abolition of slavery or the organisation of that perfect democratic scheme of Government which we now enjoy. To-day, politics are nothing but business. The politician spends his time in discussing wages, employment, housing, war debts, national finance and nationalisation of industry, and his every word is concerned with supplying our material needs.

The "Two Blacks" Policy

The ruling principle of politics may be described as the policy of the two blacks, the theory being apparently that two blacks make a white. The public will support a strike, will vote for a rate of unemployment pay, or will settle some other great economic question in any sort of haphazard manner, justifying their action on the ground that some evil exists which must be balanced. Thus the tyranny of a trade union is always justified, and often rightly so, by the tyranny of a countervailing trust or combine. On those lines we are simply going down-hill. Surely the way to deal with an evil is not to put up another evil to balance it, but to remove the evil. The thing is so obvious and so elementary that it is a mystery how "the policy of two blacks" ever came to be tolerated.

Twenty-two million electors is a pretty unwieldy mass, and it is not at all an easy matter to get them to settle a business proposition on business lines. The work of the next few generations will be to educate the people in economic and business matters to the point when they can be trusted to make wise decisions through the ballot-box. Better conditions for the workers, or for any other class, will never be obtained until we get better thinking, and better thinking is a matter of education. The education that I have in mind must be given to the people by the business men of the country. In so far as the business classes have refrained from informing the people generally on business problems they are responsible for any errors that have been made by the public in settling these questions. Take, as an illustration, the recent tram strike in London. The tramway men asked for certain wages, admitting that there were no funds out of which those wages could be paid. Meantime they ceased work. It was far too late at that stage to start thinking about economic truths. All that the politicians could do was to find some basis of agreement, however unreasonable it might be, which would get the men back to work and get the trams running again. A public which has never paid any wages, and which does not pretend to know where wages come from, simply cannot settle a strike on an economic basis. That sort of difficulty will continue with us until we reach a higher level in general education and then no such strike will take place.

The Fault of the Business Community

There are a number of simple economic questions on which I think the public mind as a whole is in need of enlightenment. I do not blame either the public or the politicians for ignorance on these questions; I blame quite definitely the business community who, clinging to the tradition that business and politics are things apart, have refrained from taking their proper share in the discussion of political questions. I want to make it perfectly plain that I am not indulging in any anti-Socialist "stunt," nor am I dealing with any party-political question. I am rather up against the purely political mind, no matter to what party it is attached—the type that may perhaps be described as the "ninepence-for-fourpence" mind, the mind that holds the idea that one can get anything by voting for it. Politics of all parties have degenerated in recent years into a sort of auction. One party puts forward a policy which is advertised as providing two jobs for one man; another offers houses, and we are within measurable distance of the time when, in order to get elected to Parliament, it will be necessary for the political candidate to throw in motor-cars! In short, the whole trend of recent events has been in the direction of inducing the public to lean on the Government and to place reliance on the ability of the politicians to provide for the material needs of the electors.

The future prosperity of our industries—the industries upon which the business men of the country, the workers and indeed the whole nation depend—is by no means, however, at the mercy solely of the politicians. The churches, the Women's Citizens Association, the Workers' Educational Association, debating societies everywhere, and a host of organisations of one sort or another, are all engaged in discussing industrial and economic questions. That discussion, in my view, is extremely dangerous unless it has behind it sound economic theory. I am, therefore, proposing to deal in nine or ten articles with a number of simple economic problems that present difficulty to the public to-day. The underlying idea is to indicate the sort of work that business men should do inside any political party to which they happen to be attached.

Ten Popular Fallacies

Here are ten fallacies which will find acceptance not only amongst Socialists but among the great bulk of our people:—

1. That the industrial revolution moved people out of comfort on the land and reduced them to worse conditions in slums.
2. That the incentive of gain is the basis of commerce and industry.
3. That wealth is commonly made at the expense of others.
4. That profits come out of wages, or wages out of profits.
5. That profits are immoral and ought to be discouraged.
6. That the middle man is useless and ought to be abolished.
7. That there exists some *right* to maintenance.
8. That the cost of living is a sound basis for wage settlements.
9. That cost of production is the prime factor in fixing selling prices.
10. The housing folly—that one can schedule requirements, advertise them to the world, then hope to buy at reasonable prices, or indeed to buy at all.

These propositions are widely held in different schools of thought. Every one of them I believe to be utterly untrue. There is not one that is not fraught with the gravest danger, and not one that does not bring trouble and destruction in its train. It is the acceptance of ideas like these—plausible as they appear to be at first sight—which provides the explanation of the *impasse* into which we have drifted.

Chemical Engineering Group

Annual General Meeting

THE annual general meeting of the Chemical Engineering Group of the Society of Chemical Industry was held at the Engineers' Club, London, on Friday, May 2. The Chairman of the Group (Mr. J. Arthur Reavell) presided.

Annual Report

Mr. H. Talbot (hon. secretary), in his report for the year ending December 31, said that the work had been largely a continuation of the policy initiated in 1922 of taking all possible steps to strengthen the organisation of the Group and to improve its financial position, and the efforts made to this end had proved extremely satisfactory. During the year the Data Sheet Committee has issued three Data Sheets, Nos. 8, 9, and 9a respectively, giving various air-drying data.

The organisation of the Chemistry and Physics Section of the World Power Conference (to be held at the British Empire Exhibition from June 30 to July 12), which was entrusted by the Council of the Society of Chemical Industry to the Committee of the Group, has resulted in the formation of a new section of the conference, viz., the "Gas and Fuel Section," the detail work of which has been taken over by the Secretariat of the National Gas Council. The efforts made in bringing this new section into being have resulted in making the conference much more comprehensive than would have been possible had the subject of power been treated from the electrical side only. The programme of the conference had now been fixed, and a most influential body of visitors was expected from abroad.

In the report the Committee recorded their appreciation of the assistance given to the Group by the parent Society. The latter body collected the subscriptions of members of the Group, and this arrangment was referred to as one of the most advantageous improvements in dealing with the Group's revenue that had so far been introduced.

The relations between the Group and the Institution of Chemical Engineers had now been definitely settled. The Group was a tenant of some of the Institution's office premises. A joint secretariat carried on the work under the general direction of the two hon. secretaries, and with the immediate supervision of a joint assistant secretary. Many of the members of the Group Committee were on the Council and Committees of the Institution, and the mutual assistance thus afforded had been of the greatest value to the organisations concerned. There had been a notable increase in membership of the Group, from 315 in 1922 to 386 in 1923. Volumes 3 and 4 (bound in one volume) of the Annual Proceedings were issued during the year. A brief reference was made to the organisation and work of the American Section, which was still under review, and the hope was expressed that this phase of the Group's activities and the best method of dealing with foreign members generally would be speedily agreed upon. Finally, the Committee were of opinion that the year has been a most successful one both scientifically and financially in developing and consolidating the Group's influence, and they expressed their gratitude to the members for their constant support. The report was adopted.

Financial Position

Mr. F. H. Rogers (hon. treasurer) presented the accounts for the year. These showed a credit balance of £140 18s. 3d. This result was achieved by an increased number of subscriptions, by the receipt of a general grant from the parent Society of £150, and by a further grant of £150 towards the cost of printing the Annual Proceedings. The sum carried forward was more than ample to cover the expected cost of the Proceedings, and Mr. Rogers said that 1923 was the first year in the history of the Group that they had ever been able to do that. The accounts were adopted unanimously.

New Officers

The Committee have elected Mr. C. S. Garland to be the new Chairman of the Group, and have re-elected Mr. F. H. Rogers and Mr. H. Talbot Hon. Treasurer and Hon. Secretary respectively.

The following were elected by the meeting to fill four vacancies on the Committee of the Group: Mr. W. H. Coleman, Sir Frederic Nathan, Mr. A. W. Yeoman and Professor E. C. Williams.

Mr. J. A. Reavell's Services

At the conclusion of the proceedings a very hearty vote of thanks was accorded Mr. Reavell, who has been Chairman of the Group for more than four years and now retires. Professor J. W. Hinchley, who proposed the vote of thanks, pointed out that Mr. Reavell had stepped into the chair at a time of very great difficulty, and that the present sound position of the Group was mainly due to his untiring work.

Following the meeting an informal dinner was held.

Bauxite for Oil Refining

Society of Chemical Industry: London Section

AT the monthly meeting of the London Section of the Society of Chemical Industry, on Monday, a paper was read by Dr. A. E. Dunstan and Mr. O'Brien, of the Anglo-Persian Oil Co., in which some account was given of the experience of the research department of that company in the use of bauxite for oil refining and its technical application.

At the opening of the paper it was stated that the late Dr. John Hood, who was for many years a member of the Society, discovered some 50 years ago that bauxite, when applied in a particular way, was a refining agent of considerable value, and for many years the Burmah Oil Co. made use of it. The experience of the Anglo-Persian Oil Co., however, dated from June, 1918, when the first experiments were carried out. The bauxite was used in a granular form by the Anglo-Persian Oil Co. and usually at a temperature of some 200° or thereabouts, and the peculiar feature was that the crushed bauxite, used in this way after roasting, acted as an effective decoloriser and also an effective desulphuriser. Moreover, experiments had shown the further peculiarity that decolorisation took place first and was nearly completed before the desulphurising action commenced. Again, it had been found that the bauxite was more effective when used hot than when used cold, and among the conclusions arrived at as the result of the work which had been done by the Anglo-Persian Oil Co. were that bauxite was a colloidal adsorbent of the first order for removing sulphur as well as colour, and that the fresher the preparation the more efficient the results. Steaming or hot water had been found to be effective for cleaning the bauxite after use, and in practice also it has been found advisable to make additions of fresh bauxite from time to time during the operations in order to maintain the efficiency. The action was described as a surface adsorption action and the natural colour of the oil was almost eliminated.

The research department of the Anglo-Persian Oil Co. had devised an instrument to which the name of the Ergometer has been given, the object of it being to enable determinations of the adsorptive efficiency of the particular bauxite to be determined. It had been found that the bauxite from various parts of the world differed as regards its efficiency, and, at any rate, as far as the Anglo-Persian oils are concerned the bauxite obtained from India has been found to be the best. Mr. O'Brien, one of the authors, had been associated with this work of the Anglo-Persian Co. since it began, and expressed the opinion that bauxite promised to bring about remarkable changes in methods of refining as far as the Anglo-Persian oils are concerned. In one case 80 per cent. of the sulphur content of the oil was removed at one filtration, but it was admitted, in answer to some points raised in the discussion, that those who had been engaged on this work were not yet able to state with certainty what was the nature of the sulphur compounds that are recovered. It was also stated that there is little or no loss of oil in the process, but this depends upon the method of regeneration of the bauxite. By the use of superheated steam the whole of the adsorbed particles were driven out and recovered, and those not driven out were not worth refining. Emphasis was laid upon the work done by the late Dr. Hood on the use of bauxite as a refining agent, and to the need for studying the particular characteristics of the bauxite used in relation to the type of oil, although the view was expressed that other oils ought also to be susceptible to treatment in this way.

Dr. Dyer was re-elected Chairman of the Section for the year.

Insulin and the Prevention of Diabetes

Society of Chemical Industry: Manchester Section

A MEETING of the Manchester Section of the Society of Chemical Industry was held on Friday, May 2, at the Textile Institute. Dr. Herbert Levinstein presided.

A resolution of condolence with the family and relatives of the late Dr. G. H. Bailey, Senior Demonstrator in Chemistry at the Owens College, Manchester University, was passed.

Detection of Persulphate in Flour

A paper was then read entitled " A Note on the Detection of Persulphate in Flour and a recent Bleaching Agent for Flour," by Mr. James Miller, F.I.C.

Mr. Miller stated that the usual means of detecting persalts in flour was by using a solution of benzidine in alcohol. His suggestion was, however, to use an aqueous solution of potassium iodide. A recently manufactured bleaching agent for flour, which is sold under the name of " Novadelox B.," consisted of a mixture of benzoyl peroxide and acid calcium phosphate. Benzoyl peroxide was an oxidising agent and a powerful antiseptic, but its use internally had been discontinued, owing to its poisonous action on the blood. The general properties of benzoyl peroxide were reviewed. The detection of benzoyl peroxide in flour was effected by the following test. The flour was mixed, with a solution of potassium iodide, into a paste and heated on a boiling-water bath. The presence of the benzoyl peroxide was indicated by the appearance of dark spots. This test would indicate the presence of half an ounce of the salt in a sack of flour (280 lb.). Slides were shown of the potassium iodide test for persulphates, and there were also exhibited pastes of flour containing benzoyl peroxide in the proportion of half an ounce per sack of flour (280 lb.), or an actual proportion of 1 in 9,000.

History of Insulin Research

Dr. Arnold Renshaw then read a paper on insulin, in which he stated that the history of research on diabetes showed how very near several investigators had been to obtaining an active pancreatic extract resembling insulin. Even the method of ligature of pancreatic duct used by Banting, to produce atrophy of all except the Islets of Langerhans, had previously been used by other workers in an endeavour to obtain the secretion of the Islets of Langerhans.

Zuelzer had nearly approached Banting's discovery in 1908, and this semi-failure was a standing example on the importance of not giving up a piece of research work until the truth was finally established. Once Banting and his co-workers had demonstrated that such an extract could be obtained, the finer methods of blood analysis now available allowed them to overcome the pitfalls into which other workers had fallen and to show that the extract was a potent one in reducing the amount of sugar in blood.

The next step consisted in getting these facts translated by clinical application into a recognised method of treatment After this, the subsequent difficulty of manufacture of insulin on the large scale had to be faced. The generosity of Banting and his co-workers in presenting the patent rights in this country to the Medical Research Council could not be overrated. The Council had assisted firms of chemists in their endeavours to produce insulin on the large scale. The manufacturing methods employed were then dealt with in detail. As much as 10,000,000 units of insulin per week could now be produced by one firm alone, or sufficient for approximately 7,000 persons.

Another feature was the manner in which the cost had been reduced to bring the product within the reach of the poor man. After seeing the ingenious methods in use by one large manufacturer of insulin it would come as no surprise if there was still a further reduction in the cost of this product

The Cause of Diabetes

Referring to the prevention of diabetes, Dr. Renshaw pointed out that the cause of diabetes was bacterial in origin, and that its onset could be assigned to the activities of the *B. Amyloclasticus Intestinalis*, described two years ago by Mr. Fairbrother and himself. Reasons were given to show how the ferment arising from this organism could disturb the function of glycogen formation; and how such disturbance was translated into terms of an increased secretion from the Islets of Langerhans followed by exhaustion of the cells. In other words, the disturbed metabolism met with in diabetes had its origin in the bacterial fermentation present in the intestines. Such an action must be specific in its neutralisation of the secretion from the Islets of Langerhans. There were very few bacteria which could act upon glycogen, which was the substance most concerned in a study of diabetes. The ferment arising from the bacillus mentioned could, however, act upon this substance, and it appeared probable that there was some stereo-chemical relationship between the anti-ferments or antitoxins produced against this bacillus and the insulin or ferment produced by the Islets of Langerhans. The ferment produced by the latter assisted in building up glycogen from glucose; the ferment produced by the bacillus broke down glycogen. Furthermore, it had been shown that the liver cells most concerned in the storage of glycogen from glucose could absorb the bacillary ferment.

From a consideration of these facts it appeared that the prevention of diabetes offered the main hope. Once the pancreatic islets had been exhausted, insulin appeared the only treatment along passive lines. A few early cases might be improved if the absorption of bacillary ferment could be checked. The organism occurred amongst bad potatoes, and Professor Fowler had recently described a similar organism occurring in bad rice. The significance of this fact in relation to the higher percentage of diabetes amongst the Hindus could not be over-rated. A similar organism occurred in fermenting maize, producing an alochol. Possibly this fermented maize drink was responsible for the presence of diabetes in a non-civilised race like the North American Indians. This bacillus had been found in, approximately, three out of every four cases of diabetes examined by him.

Alkali Works Inspector's Death

His Last Visit to Chemical Works

THE circumstances surrounding the death of Mr. Harold James Bailey, O.B.E., a Government inspector of alkali works, of Ingleside, Heath Park Avenue, Llanishen, who was found unconscious in a locked room at his residence on April 17, and who died shortly afterwards, were revealed at an inquest held by the Cardiff coroner (Mr. Gerald Tudor) on Wednesday, April 30.

The widow, Mrs. Edith Bailey, said he husband left home for North Wales towards the end of March, with the intention of afterwards visiting Yorkshire to inspect factories. His health was good when he left, but on his return he complained of feeling unwell. The witness had received letters from him, and in one of these he said he visited the Old Silkstone Chemical Works, Barnsley, just after two men had been gassed when cleaning out a tank. He further told her that he and the manager had examined the tank and that he felt no immediate effects of the gas, but the manager was visibly affected. On the following day he said he experienced dreadful pains in the neck and abdomen. " I really thought I should die," he added. On Tuesday he went on to inspect local factories, and visited Port Talbot on the Wednesday. When he returned home, at 5.30, the witness asked him how he felt, and he replied, " I can't throw it off," and later he said that spots had broken out at the back of his neck. The witness told him to sit by the fire and take a rest, which he did, and remained by the fire until retiring to bed, taking a basin of bread and milk before he did so. The witness, a little later, heard groans, followed by heavy breathing, coming from an adjoining room, which she found to be locked. The only means of access to the room was a painter's ladder which had been left against the window sill of the room in which her husband was. The witness told her son to climb the ladder and gain access to the room through the window. This the boy did, and found his father lying huddled up on the floor. A doctor was summoned, and arrived shortly afterwards, but Mr. Bailey passed away a little later.

John Thorpe, 61, Bramwell Street, Barnsley, manager of the Old Silkstone Chemical Works, Barnsley, described how on April 4 a man was partially gassed in a tar-still. Mr. Bailey arrived at the works about 2.45 p.m., and the witness told him of the occurrence. Mr. Bailey appeared to be perfectly well. Shortly afterwards they went together to examine the still, and after inspecting the outlet found no trace of gas for the

witness had shut of the adjoining still, from which the gas came into the still in question, a few minutes after the accident. They went to the manhole of the still, and Mr. Bailey inserted a shilling in the tank, but when he removed it it was not discoloured, and he remarked to the witness, " There is no gas here." Mr. Bailey then applied further tests at the bottom of the still to a filter paper and discovered traces of sulphuretted hydrogen.

In reply to the Coroner the witness stated that he stood at the entrance to the still, while Mr. Bailey was at his side. A couple of days later Mr. Bailey spoke to him on the telephone and said he felt " Right off colour," but that he could not see how it could have been the gas. Mr. Bailey inquired how the witness felt, and he replied that he had suffered no ill-effects.

Dr. T. Lewis Bailey, chief Government inspector of alkali works, said that when he met Mr. Bailey in Halifax the latter said that he was not feeling at all fit, and thought the trouble was the gassing occurrence of the previous Friday. On the Saturday night he was violently sick, and also on the Sunday. The witness said that together they visited several factories in the North of England, but on the 10th he told Mr. Bailey to return home as he still appeared to be very unwell.

Dr. S. A. Shiach, Llanishen, said he found Mr. Bailey lying on a bed unconscious and suffering from an epileptic form of convulsions. Hypodermics were prepared to relieve the convulsive attacks, but before they could be used the patient suddenly stopped breathing. Both lungs were intensely congested. The stomach was removed and sent to the Home Office for examination, but the tests applied gave normal results. Death was due to a rupture of a blood-vessel of the brain due to acute congestion of the lungs. The witness thought that the congestion of the lungs might have been precipitated by exposure to an irritating gas.

The Coroner said that the doctor has said that death was due to cerebral hemorrhage, but although the lungs were congested Dr. Shiach could not find any trace of sulphuretted hydrogen. He would return a verdict in accordance with the medical evidence, but did not feel justified in finding that Mr. Bailey did or did not inhale gas. He expressed his sympathy with the relatives, and other expression were added by Mr. Thorpe, the manager of the Old Silkstone Works, and Dr. Bailey, on behalf of the Ministry of Health.

Colonel Bruce, of Messrs. Morgan, Bruce and Nicholas, watched the proceedings on behalf of the relatives. Dr. Llewellyn Williams and Dr. Lewis Bailey represented the Ministry of Health, and Captain Glyn Edwards, H.M. Inspector of Factories, sat with the Coroner.

Synthetic Asphalte

At the ordinary general meeting of the Val de Travers Asphalte Paving Co., Ltd., held in London on Wednesday, Mr. T. D. Cooper, the chairman, in the course of his speech referred to the extension in the activities of the company in connection with a synthetic plant. They had hitherto confined their operations to compressed asphalte, but there had been for years past a growing desire for a cheaper material. After careful consideration the board had decided to open out in that direction, and they were now in a position to take orders. They had a staff appointed to look after that particular department which they hoped would prove successful. In addition to that, and partly in connection with it, they had taken a very considerable interest in a quarry in Wales, and the stone therefrom would be very largely used in connection with this new extension.

Closing of Finsbury Technical College

In view of a letter addressed by the London County Council to the Council of the City and Guilds of London Institute, it is understood that there is no other course open to the Council of the Institute but to make arrangements to close down Finsbury Technical College in July, 1926, or possibly before that date. The letter recalls that in February, 1921, the London County Council decided to make a grant of £10,000 a year in aid of the maintenance of the college for the quinquennial period ending July 31, 1926. After full consideration of all the circumstances, it is stated, the Council has reluctantly come to the conclusion that it is not justified in continuing its support to the college after that date.

Chemical Matters in Parliament

Pitch Lake Concession, Trinidad

Mr. Barnes (House of Commons, May 1) asked the Secretary of State for the Colonies what were the terms of any Crown concession granted for Trinidad lake asphalte (pitch lake); and to whom the concession was granted, when, and for how long.

Mr. Thomas, in replying, said that a concession over the pitch lake was granted in 1888 to Mr. J. W. Previté, Mr. H. A. Greig, and the New York and Trinidad Asphalte Co., for a period expiring in 1930. The main features in the terms of the concession were the grant of exclusive rights over 114 acres to all pitch, asphaltum oil, petroleum oil, anthracite rock and asphaltic and bituminous substances, and other substances whatsoever. The payment of a minimum rent of £10,000 a year, and a royalty on every ton of asphalt produced in excess of 30,000 tons of 1s. 8d. An undertaking by the Crown that during the continuance of the concession, no asphalt, pitch or other asphaltic or bituminous substances should be taken from any lands in the possession of the Crown within three miles of the pitch lake. An undertaking by the company to provide the Government at La Brea with such asphalt as may be required for the public works of the Executive Government of Trinidad.

Output of Phosphate at Nauru

Mr. J. H. Thomas (House of Commons, May 5), in replying to a question by Mr. Clayton, said that the output of phosphate at Nauru in the period of 3½ years since these deposits came under Government control, amounted to 1,253,280 tons, of which 32,300 tons were distributed to the United Kingdom, 794,570 tons to Australia, 126,800 tons to New Zealand, and 299,610 tons to other countries. The present f.o.b. price was about 42s. per ton or approximately 15s. below that of the last cargo. It was further stated that the amount of interest on capital and sinking fund charges paid annually by the Nauru/Ocean Island undertakings to the owning Governments was £224,053 representing up to December 31, 1923, a charge of about 12s. 6d. per ton.

Anglo-German Dye Negotiations

Mr. Sandeman (House of Commons, May 7) asked what steps the Government proposed to take in view of the report made by Sir William Alexander at the annual meeting of the British Dyestuffs Corporation, to the effect that the final decision as to the policy of the corporation in regard to arrangements between them and the I.G. lay with the Government.

Mr. Alexander: The matter is receiving the earnest attention of the Government, but I am not yet in a position to make a statement.

Phosphate Supplies

Major Edmundson (House of Commons, May 6) asked the Secretary of State for the Colonies, whether, in view of the fact that importation of North African phosphate is being largely assisted by the greatly reduced exchange value of the franc, he would state what steps he proposed to take to increase the supply of phosphates from British Dominions to this country.

Mr. Buxton, in replying for the Secretary of State for the Colonies, said that the high freight on phosphates coming from Nauru made it impossible for supplies from that island to compete with the abundant and cheap supplies which are at present available from sources more favourably situated nearer home.

A Wembley Souvenir

A most attractive brochure has been brought out by the British Drug Houses, Ltd., in connection with the Wembley Exhibition. This is printed in brown ink on a toned paper, and contains some thirty pages with numerous illustrations of different sections of the company's works. The matter in the text deals with the history of the firm and describes the principal products under four sections—viz.: (1) medicinal chemicals, (2) laboratory chemicals for various purposes, (3) pharmaceutical products, and (4) proprietary pharmaceutical and toilet specialities. The production forms a valuable record of the activities of a progressive British firm which should not be without effect in certain quarters.

From Week to Week

MR. P. F. GORDON has been granted the degree of Ph.D. at Glasgow University for work on the separation of the components of petroleum.

THE DEATH is announced at Winterthur on April 26 of Mr. Olaf Kjelsburg, chief constructing engineer to the Swiss Locomotive and Machine Works, Winterthur (Switzerland).

IN THE UNIVERSITY OF MANCHESTER Mr. Hugh O'Neill, M.Met (Sheffield), has been appointed Lecturer in Metallurgy, and Mr. Douglas Jepson, M.Sc. (Manchester), Assistant Lecturer in Physics.

TWO BRONZE TABLETS have been erected in the pavilion on the Boots' Athletic Ground, in memory of the 320 employees of the Nottingham branches of Boots, the chemists, who gave their lives in the war.

THE BIRMINGHAM COUNCIL on Tuesday appointed Mr. Joseph Marshall, one of the Inspectors of the Public Health Department, to act as official sampler under the Fertilisers and Feeding Stuffs Act, 1906.

A DEPUTATION OF WHITE LEAD WORKERS will wait upon the Home Secretary next week to protest against the Lead Paint (Protection Against Poisoning) Bill, which prohibits the use of white lead in interior painting.

A NEW PHOTOGRAPHIC DEVELOPER, which is a chlorine derivative of phenol, has been prepared by Professor W. G. Christiansen, of Harvard Medical School, U.S.A., which he claims to be at least equal in its effectiveness to "metol."

DAMAGE ESTIMATED AT £50,000 was caused by an outbreak of fire in the premises of J. D. Hamilton, Ltd., oil manufacturers, Glasgow, on Sunday, May 4. The fire raged for three hours, and streams of burning oil flowed down the streets.

THE PREMISES OF BISHOP AND CO., chemical manufacturers, of Commercial Road, London, have on three occasions been broken into. The reason for the intrusion is a mystery, as on each occasion only a small quantity of stock has been taken, and the cash-box ignored.

THE FOURTH CONGRESS OF INDUSTRIAL CHEMISTRY, under the auspices of the Société de Chimie Industrielle, is to be held at Bordeaux commencing on June 15, 1924. Fellows and Associates of the Institute who propose to attend the Conference are invited to communicate with the Registrar.

WHEN OPENING A CASE of chemicals at the British Industries Fair, White City, on Wednesday, April 30, Mrs. Broadstreet, of Manchester, was injured by the bursting of a container. One side of her face and one eye were covered with hydrochloric acid, and it is feared that she may lose the sight of the injured eye.

TWO MEN WERE OVERCOME by acid fumes at the works of Cockburn and Co., Glasgow, on Monday, April 28. A glass vessel containing a chemical was upset and the fumes caught fire through contact with the flame from a gas jet. A box of rubber sponges also caught fire, but the outbreak was soon extinguished.

DR. H. A. D. JOWETT, head of the Burroughs Wellcome Research Laboratories, was unfortunately taken suddenly ill early in the week, and no letters are being forwarded to him. As a consequence he was unable to give his lecture on "The Organisation of Research in Chemical Works" before the Northern Polytechnic Chemical Association on Tuesday.

ARRANGEMENTS are being made by the Institute of Chemistry Students' Association for a special visit of students in chemistry to the British Empire Exhibition during July. The exhibits will de demonstrated, and it is hoped that arrangements will be made for fares, entrance and luncheon at special rates. Those interested should apply to the Honorary Secretary, R. T. Claydon, 116, Queen's Road, Finsbury Park, London, N.4.

AT A MEETING of the Institution of Rubber Industry in London on Monday, a paper was read by Mr. James Fairbairn on "A Plea for Closer Working in the Rubber Industry." Mr. Fairbairn said that if the deletion of motor tyres from the McKenna duties had not taken place the tyre manufacturing industry of Great Britain, instead of being as it was to-day, in a perilous position, would have been a flourishing industry.

A PAPER ON "The X-Ray Analysis of Coal" was read before the Royal Scottish Society of Arts in Edinburgh on Monday, by Mr. C. Norman Kemp, B.Sc. The lecturer said that hitherto, excepting in the thinnest sections, the visual study of coal had been arrested at its surface, but now the opaque coal substance was transformed into a transparent ice-like mass in which the most minute details of the mineral skeleton were laid bare.

THE CHEMICAL DEPARTMENT of the Birmingham University, during Birmingham's civic week at the British Empire Exhibition, will show several appliances employed in chemical investigations, and a collection of research chemicals, including a unique set of germicidal tellerium compounds discovered recently at the University. This exhibit will be on view from 11 p.m. to 4 p.m. in the chemical building of the University at Bournbrook from May 6 to May 17.

A MEETING OF REPRESENTATIVES of dyers in unions covered by wage agreements, held in Bradford on Saturday, May 3, under the chairmanship of Mr. Edward Verity, considered a joint application to the employers for a general advance in wages. After a long discussion the gathering was adjourned until Thursday, May 8, for the operatives' representatives to meet in Manchester. Approximately 80,000 operatives in Yorkshire, Lancashire, Cheshire, and Derbyshire are affected.

THE DEATH TOOK PLACE at Milltimber, near Aberdeen, on Saturday, May 3, of Mr. Thomas Jamieson, late City Analyst, of Aberdeen. For 15 years Mr. Jamieson was the Fordyce lecturer in agricultural chemistry at Aberdeen University, and also for a long period a director of the Agricultural Research Association at Aberdeen. He was one of the original Fellows of the Institute of Chemists, and in recognition of his scientific agricultural research was awarded the distinction of Chevalier of France. Mr. Jamieson was over 70 years of age.

A STATEMENT has been issued showing the amounts paid during the year ended March 31 last into the special account under Section 1 (3) of the German Reparation (Recovery) Act, 1921. The receipts total £10,921,541, consisting of £1,843,158 balance in hand, £914,583 repaid from Army funds to adjust over-issue for costs of the British Army of Occupation for the previous year, and £8,163,800 paid in by the Commissioners of Customs and Excise. For the year under review £437,715 was paid to the Army funds on account of the costs of the British Army of Occupation, leaving a balance in the hands of the Paymaster-General of £10,483,825.

CANADA POSSESSES one of the very few known deposits of dental spar, the superior grade of snow-white potash feldspar much used in the manufacture of artificial teeth, and, according to the Ottawa Department of Mines, an attempt is being made to interest the British market in this product. The annual output of dental spar is only a few hundred tons, most of which goes to the United States. Some of the spar is re-exported to this country and to Europe generally. Canada has also a large output of crude feldspar as used by the potteries. Large quantities of this too—as much as 39,000 tons in a single year—go to the Eastern United States.

IN THE BULLETIN of the British Association of Chemists (which mainly consists of reports of the recent annual meeting) reference is made to the retirement of Mr. Brightman from the post of editor. "Mr. Brightman," it is stated, "has laid the Association under a great obligation by his unstinted labours on the magazine, and it is from every point of view a matter of regret that he is unable to carry on his voluntary work owing to pressure of other duties. We are sure our members will unite with the Council in expressing to him our appreciation of what he has done and our hope that from time to time he may find it possible to contribute to our pages."

WE HAVE RECEIVED from Captain T. A. Newton, of Launceston, Tasmania, a descriptive booklet of that port and the island of Tasmania. Captain Newton points out that there is a good opening for a dyeworks in the state, there being already a demand, while natural resources are being developed rapidly. There is cheap electric power available in Launceston, with excellent shipping facilities to the great Australian ports. There are also large coal deposits in the island, which are now being opened up. Anyone who is interested in the matter should apply to Captain Newton, P.O. Box 247, Launceston, Tasmania, who will gladly give further information.

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Abstracts of Complete Specifications

213,631. Cellulose Acetate, Manufacture of. L. A. Levy, 31, Shoot-up-Hill, Cricklewood, Middlesex. Application date, November 3, 1922.

The process is more particularly for the manufacture of cellulose acetate used for the production of artificial filaments. Such cellulose acetate is usually dissolved and then filtered, but the solution is of high viscosity and necessitates the use of large filter presses. In this invention, the tri-acetate is partly hydrolysed by any known method, and the viscosity is thereby much reduced so that the solution may be filtered by a relatively small plant. The cellulose acetate is then precipitated and dissolved again to form a solution for spinning. In an example, the cellulose triacetate is hydrolysed to render it soluble in acetone by adding a 50 per cent. mixture of acetic acid and water, and heating to 35°-40° C., until the required solubility is obtained. The viscosity can be further reduced by the addition of water in insufficient quantity to start precipitation.

213,638. Separation of Arsenic and Tin in Presence of Antimony. H. Harris, 54, New Broad Street, London, E.C.2. Application date, December 4, 1922.

The process is for treating a mixture containing caustic soda in large proportion produced by the refining of lead with caustic soda, and containing arsenic, and/or tin, and/or antimony. The process can be applied to the mixture produced in refining lead, in which a reagent is used consisting of caustic soda, sodium chloride, and an oxidant such as sodium chlorate or nitrate. (See Specification No. 189,013, The Chemical Age, Vol. VII., p. 896.) It is found that the arsenic can be removed in a single operation from the hot mixture as a sodium oxysalt by cooling and crystallisation, since it is only slightly soluble in water containing much caustic soda. The mixture containing tin, arsenic, and antimony is dissolved in hot water, in which the contained oxysalt of antimony is insoluble. The hot solution with the suspended antimony salt is decanted from the granules of lead, and the antimony salt then allowed to settle out. The temperature is kept at a point above that at which the oxysalts of arsenic and tin crystallise, *i.e.*, about 70° C. These oxysalts are then crystallised by cooling to 25°-30° C. The arsenic salt crystallises whether tin is present or not, but the tin salt only crystallises completely when arsenic is present in the proportion of 3 : 1. To obtain this proportion, the lead or alloy is refined in a mixture of various grades, or caustic solutions from previous operations rich in arsenic and tin respectively are mixed, or arsenic may be added to the solution. The strength of the solution must be such that the specific gravity of the solution is about 1·35.

The crystallised salts are separated, and the remaining liquor contains most of the free caustic soda and sodium chloride, except that removed with the antimony precipitate. The solution is concentrated to a specific gravity of about 1·6, when the sodium chloride crystallises, leaving a caustic soda solution which may be used again for lead refining. The oxysalts of arsenic and tin obtained are redissolved in hot water and recrystallised to remove small quantities of antimony precipitate and free caustic soda.

The crystals containing arsenic and tin are again dissolved in water, and the solution treated with calcium carbonate, which precipitates all the tin leaving the arsenic in solution. The solution may be boiled with caustic lime to precipitate calcium arsenate, which is filtered off, and the solution is then treated with a further quantity of caustic lime to convert the sodium carbonate into caustic soda for use again in refining lead. A modified process is also described.

213,661. Purifying and Hydrogenating Heavy Mineral Oils, Coal Distillates, Coal Slimes, or Other Heavy Hydrocarbons. Internationale Bergin Compagnie voor Olie en Kolen-Chemie, Plaats 11a, The Hague, Holland, and M. Hofsass, 1a, Fischerstrasse Mannheim-Necharau, Germany. Application date, January 2, 1923.

When heavy mineral oils, coal distillates, coal slimes, etc., are cracked by heating under high pressure with hydrogen, it is usually necessary to subject the raw distillate to further refining to remove sulphur, but in the present invention the necessity for the subsequent desulphurisation is avoided by carrying out the hydrogenation in the presence of sodium or other element of the sodium group, such as potassium, rubidium or caesium. The temperature of hydrogenation is 100° C. or more, and it is found that the presence of sodium effects a complete desulphurisation in a short time, and the bromine number of the products is greatly reduced, *i.e.*, an increased hydrogenation takes place. In an example, Mexican oil is heated with 5 per cent. of metallic sodium in an autoclave to 420° C. with hydrogen at a pressure of 50 atmospheres. The viscous raw oil containing 3·5 per cent. of sulphur is converted into a thin oil of which the benzene and kerosene fractions contain only traces of sulphur. In another example, a mixture of 65 per cent. anthracene, 3 per cent. of metallic sodium, and 3 per cent. of Fuller's earth are heated in an autoclave to 300° C. with hydrogen at 100 atmospheres. The mixture is subjected to fractional distillation, yielding decahydride of anthracene as the main product. In another example, naphthalene is simultaneously desulphurised and hydrogenated by heating with sodium to 300° C. in an autoclave with hydrogen at 100 atmospheres pressure. The product may be filtered and distilled, yielding pure tetra-hydro-naphthalene. The reaction may be accelerated by the addition of Fuller's earth, diatomite, powdered charcoal, iron powder or magnesium oxide. The process can also be applied to slightly hydrogenated intermediate products.

213,711. Alkali Salts of Higher Fatty Acids, Production of. W. Lund, Sibyllegatan 6, Stockholm. Application date, January 22, 1923.

The object is to obtain alkali salts of higher fatty acids in the form of soap or washing powder. The ingredients, *i.e.*, oil or fat, sodium hydroxide solution, sodium carbonate and water, fillers, etc., are blown into a container in a finely divided state from nozzles by air pressure, so that the oil is immediately saponified, yielding a dry powder. In carrying out the process, calcined sodium carbonate is blown through a nozzle by air at a pressure of 1·1-2 atmospheres, and the fat or oil is blown through another nozzle at a pressure of 2-4 atmospheres, and the sodium hydroxide solution is similarly blown in through a third nozzle. The various jets are caused to impinge on one another to produce a more intimate mixture. The dry soap powder settles to the bottom of the container. When fats containing more or less fatty acids are used, only sufficient alkali is employed to saponify the neutral fat, and sufficient sodium carbonate to correspond to the fatty acids. Instead of spraying by means of air under pressure, the solution of sodium or potassium carbonate and/or hydroxide may be heated to a high temperature and pressure, and these solutions may be used for introducing the melted fat or oil into the reaction chamber.

213,765. Cellulose, Treatment of—and Obtaining an Improved Product. Courtaulds, Ltd., 19, Aldermanbury, London, S. S. Napper, Nevern, Grange Road, Horsell, Woking, and C. Diamond, 29, Park Road, Westcliff-on-Sea, Essex. Application date, March 29, 1923.

The object is to render cellulose more resistant to the wetting of water. The cellulose is dried and then brought into contact with chlorine, either as a gas or in solution in an organic solvent. The cellulose is not oxidised or weakened, and if dyed is not bleached, but its resistance to the wetting action of water is increased. This property is advantageous when the cellulose is employed in the form of artificial silk. The material thus treated may also be treated with wax to increase further its water resisting properties, but the quantity of wax required is considerably less than that necessary if the preliminary treatment with dry chlorine is not employed.

213,818. Water Gas, Manufacture of. Humphreys and Glasgow, Ltd., 38, Victoria Street, Westminster, London. From O. B. Evans, Broad and Arch Streets, Philadelphia, Pa., U.S.A. Application date, July 3, 1923.

In the manufacture of water gas, the temperatures are usually regulated by varying the duration of the blow or run in such a manner that after a number of cycles the required temperature is obtained. In this invention, each blow or run is terminated independently of the succeeding steps when the desired temperature has been reached. This is effected by automatic mechanism controlled by the temperature, and

actuating the blow or run valves. A shaft 1 carries cams 2, 3 (Fig. 4), each of which works a pilot valve which controls the admission and exhaust of pressure fluid to the operating pistons of the main valves. The latter control the air blast to the generator, the steam admission to the generator, the stack valve, and the air admission to the carburettor. The shaft 1 is driven by an electric motor 17, and carries a stepped cam 18 on which rest contacts 19, 20 of different lengths, the latter having a bridge 21. When the contacts are on the larger radius of the cam the motor circuit is completed through

Fig. 4

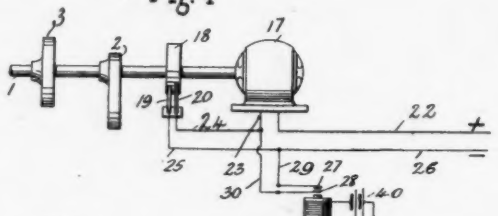


Fig. 6

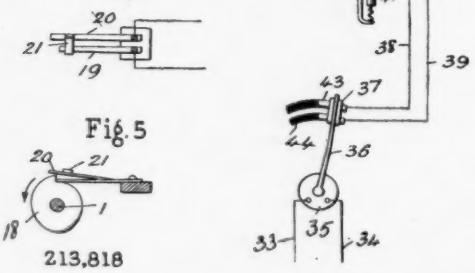
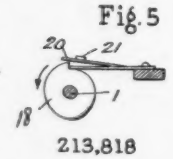


Fig. 5



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22, 23, 24, 20, 21, 19, 25, 26. When the shorter contact 19 drops into the position shown in figure 5, the motor circuit is broken, and the shaft 1 will come to rest during a blow or run, provided the contact 27, 28 is open. If the latter contact is closed, the motor goes on running, and the cycle proceeds. A pyrometer in the producer operates a galvanometer needle 36, and the latter is periodically pressed in a direction at right angles to its plane of rotation by a rotating cam, so that if it is over the contacts 43, 44 it connects the latter and completes the circuit including the solenoid 41, and controls the contacts 27, 28. The apparatus is arranged so that if the temperature in the producer is insufficient, the contact 43, 44 is not closed, and the contacts 27, 28 remain open, so that the motor stops and the blow or run continues until the temperature is sufficient to move the galvanometer needle 36 into such a position that when it is depressed, the contacts 43, 44 are closed, which results in the closing of the contacts 27, 28, the continued running of the motor 17 notwithstanding the action of the cam 18, and the starting of the next step in the gas-making process. The apparatus therefore ensures that the required temperature is reached before the cycle can proceed.

NOTE.—Obstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: —192,089 (J. J. Deschamps) relating to a method for facilitating chemical or physical reactions in masses of loose material, see Vol. VIII., p. 350; 200,810 (Chemische Fabrik Flora) relating to para-amino-benzoyl derivatives of 2-methyl-4-diethyl-amino pentanol-5 and 2-methyl-4-dimethylamino-pentanol-5, see Vol. IX., p. 319; 201,941 (W. Eberlein) relating to the manufacture of silicates of the basic dyestuffs, see Vol. IX., p. 402; 204,721 (Farbwerke vorm. Meister, Lucius, and Brüning) relating to arseno-benzene derivatives, see Vol. IX. p. 637.

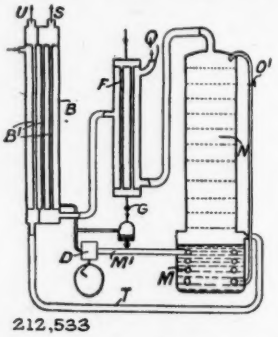
International Specifications not yet Accepted

212,252. DYES. H. Pereira, 3, Freynng, Vienna. International Convention date, March 2, 1923.

Benzoyl perylenes, such as dibenzoyl-perylene or a mixture of perylene and benzoyl chloride may be treated with aluminium chloride, yielding vat dyestuffs which dye cotton in blue- or red-violet shades.

212,533. SEPARATING GASEOUS MIXTURES BY LIQUEFACTION. L'Air Liquide, Soc. Anon, pour L'Etude et l'Exploitation des Procédés G. Claude, 48, Rue St. Lazare, Paris. International Convention date, March 10, 1923.

Air is compressed to ten atmospheres pressure, and is passed through a heat interchanger B where it is cooled by the separated oxygen and nitrogen passing in the opposite direction through tubes B^1 to the outlets U,S. The air is then expanded in a motor D, from which it passes to a coil M in the botton of a rectifying column N. The air then expands through a valve O^1 into the top of the column, and liquid oxygen collects at the botton and cools the coil M. Gaseous oxygen is withdrawn just above the liquid, and passes by a pipe T to the interchanger B. Nitrogen passes from the top of the column to another interchanger F, from which part



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passes to the interchanger B and part to the outlet Q. The interchanger F is employed to cool air compressed to 800 atmospheres, and the air is then expanded and passed through the motor D, the liquid so formed passing through the pipe M^1 to the coil M. The process thus employs expansion with external work, and uses the separated gas or gases to cool part of the mixture and liquify it wholly or in part; this part of the mixture is compressed to a higher pressure than the other part, and the liquid produced is expanded by throttling to a pressure greater than that of the separating column, and the gas produced is expanded with external work, liquefied, and separated. The high and low pressure expansions are combined in one apparatus.

LATEST NOTIFICATIONS.

214,951. Process for the manufacture of calcium arsenate. Soc. Chimique des Usines du Rhône. April 27, 1923.

214,999. Methods for producing hydrocyanic acid from sulphocyanic acid or its compounds. Dubois, A. April 23, 1923.

215,000. Process for the preparation of diethyl-sulphate from ethylene. Ledoga Soc. Anon., and Maimeri, C. April 23, 1923.

215,007. Manufacture of arylidoquinones. Soc. of Chemical Industry in Basle. April 24, 1923.

215,011. Manufacture of amorphous silica acid. Elektro-Osmose Akt.-Ges. April 26, 1923.

215,012. Manufacture of new sulphurised compounds of phenol or of a derivative or substitution product of phenol, and their applications as mordants. Soc. Alsacienne de Produits Chimiques. April 27, 1923.

215,021. Manufacture of halogenated oxythionaphthenes. Farbwerke vorm. Meister, Lucius, and Brüning. April 28, 1923.

Specifications Accepted, with Date of Application

189,458. Alcohol, Distillation and rectification of. E. Barbet et Fils et Cie. November 21, 1921.

194,694. *p*-amino-phenol-Process for the manufacture of. G. Poma. March 9, 1922.

195,064. Alloys of magnesium and aluminium, Manufacture and production of powders of. J. Sejournet. March 16, 1922.

199,027. Lithium nitride, Process for the preparation of—in a powdered state. C. Urfer. June 12, 1922.

201,528. Salts of barium and strontium soluble in water, Process for the production of—from the residues of the manufacture of barium sulphide and strontium sulphide. Rhenania Verein Chemischer Fabriken Akt.-Ges. July 31, 1922.

205,046. Metals having a high melting point, such as tungsten, Electrical process for obtaining. Soc. Anon. des Brevets Berthet. October 3, 1922.

214,293. Halogenation of hydrocarbons and their derivatives. H. T. Tizard, D. L. Chapman, and R. Taylor. December 14, 1922.

214,330. Acetyl cellulose in alkaline liquids, Treatment of. Clayton Aniline Co., Ltd., and J. G. Grundy. January 18, 1923.
214,344. Materials that solidify with a rise in temperature, Method of and apparatus for solidifying. E Cowles and Electric Smelting and Aluminium Co. January 23, 1923.
214,358. Compounds of sulphur with alkali or alkaline-earth metals. E. E. Naef. January 31, 1923.
214,477. Rubber from rubber latex, Process for obtaining. J. Oltmans. May 24, 1923.
214,478. Oils from oilseeds, Continuous process for recovering. P. L. Fauth. May 28, 1923.
214,483. Titanic oxide from titaniferous iron ores, Process for the production of. Chemische Werke vorm. Auerges. Kommanditges., F. Sommer, and J. d'Ans. May 30, 1923.
214,516. Azo dyestuffs (corinth coloured to black), Manufacture of. A. G. Bloxam. (*Chemische Fabrik Griesheim-Elektron.*) July 11, 1923.
214,521. Film-mills for perfect emulsification of liquids and semi-liquids and for grinding solids, such as coal, pitch, and the like by means of dispersors. J. H. Carter, Ltd., C. May, and L. Barradell. July 26, 1923.
214,532. Electric furnaces, particularly for the melting and the treatment of composite metals and alloys. L. Lombardi. August 14, 1923.
214,544. Fuel gas, Process for the manufacture of. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) September 17, 1923.

Applications for Patents

Badische Anilin and Soda-Fabrik and Johnson, J. Y. Process for transforming oxides of carbon into organic compounds. 10,435. April 28.
Bahlsens Keksfabrik Akt.-Ges., H. Collapsible packing cases, etc. 10,455. April 28. (Germany, April 26, 1923).
Bailey, A. A. Cartons, etc. 10,910. May 3.
Baker, C. Saucers and teapot, etc., stands. 10,970. May 3.
Baker, Ltd., F. E. Internal combustion engines. 10,888. May 2.
Baker Perkins, Ltd. Baking, etc., apparatus. 10,889. May 2.
Ballert, O. Automatic lubricating device for axles, etc. 10,704. April 30. (Germany, May 2, 1923.)
Barker, R. W. (American Bank Note Co.). Numbering heads. 10,763. May 1.
Barnes, W. S. Cutter for vermicelli, etc. 10,629. April 30.
Barnes, W. T. Boxes for holding roll of fabric. 10,621. April 30.
Baron, J. T. Economiser for steam boilers. 10,376. April 28.
Barrett, R. R. Gordon-. Water atomiser or carburettor for internal combustion engines. 10,561. April 29.
Bartlett, B. W. Automatic pigeon-timing clock. 10,612. April 30.
Batchelor and Co. (Sheffield), Ltd. Packets or boxes for food. 10,624. April 30.
Bates, F. Variable electric resistance. 10,644. April 30.
Baxenden, T. G. Spools for camera films, etc. 10,646. April 30.
Bayer and Co., F. See Farbenfabriken.
Baxendale, W. Waist-belts. 10,808. May 1.
Borrmann, C. H. Distillation. 10,883, 10,884. May 2.
Bright, H. E., and Owsley, I. Spraying nozzle. 10,967. May 3.
British and Foreign Lime and Power Corporation, Ltd., and Reid, T. A. Manufacture of gaseous fuel from lime-kiln gases. 10,989. May 3.
Durand and Huguenin Akt.-Ges. Manufacture of disazo-dyestuffs. 10,882. May 2. (Germany, May 2, 1923.)
Farbenfabriken vorm. F. Bayer and Co. Dyeing acetate silk. 10,791. May 1. (Germany, May 1, 1923.)
Farbwerke vorm. Meister, Lucius, and Brüning. Manufacture of halogenated oxythionaphthenes. 10,479. April 28. (Germany, April 28, 1923.)
Farbwerke vorm. Meister, Lucius, and Brüning. Process of making methane. 10,794. May 1. (Germany, May 1, 1923.)
Scottish Dyes, Ltd., W. Smith, and Thomas, J. Dyestuffs and dyeing. 10,886. May 2.
Telfer, J. S. G. Fertiliser. 10,974. May 3.
Velut, R. Filtering devices. 10,847. May 2. (France, May 12, 1923.)

Carburisation Problems

THE makers of the well known Wild-Barfield automatic electric furnace issue a number of heat treatment bulletins dealing with various applications of systematic heat treatment. One of those recently issued (No. 32) deals with "Carburisation," or the production of a zone of hard high carbon steel on a relatively mild core, and has been written by Mr. J. W. Urquhart. The success or failure of the process lies in the careful control of heat; uncertainty in this respect leading to flaking and softening of the core. It is in this direction that the automatic furnace scores heavily. Copies of the bulletins can be obtained on application to Automatic and Electric Furnaces, Ltd., Elecfurn Works, 173-175, Farringdon Road, London, E.C.1.

Keene's Manufacturing Co.

Bankruptcy Discharge Granted

THE affairs of Mr. Irving Alexander Keene (described in the receiving order and trading as the Keene Manufacturing Co.), manufacturing chemist, 52, Gray's Inn Road, London, W.C., who was adjudged a bankrupt on November 5, 1921, came before Mr. Registrar Francks at the London Bankruptcy Court on Friday on the hearing of his application for an order of discharge. In his report the Official Receiver said that according to the trustee in bankruptcy 28 proofs of debt for sums amounting to £15,649 had been lodged against the estate and they had been admitted to the extent of £12,587. One proof for £1,383 had been postponed, and there was a claim of £122 returned in the debtor's statement of affairs in respect of which no proof had been lodged. The assets, which were valued by the debtor at £2,046, had actually realised £5,944, and a first and final dividend of 3s. 6½d. in the £ had been paid. The debtor was an American citizen, and had not been naturalised in this country. The debtor was the proprietor of secret formulæ—namely, Keene's Corn Cure, Keene's Cold Cure Paste and Razorite Paste. At his public examination he refused to disclose the formulæ and his refusal was reported to the Judge, who ordered him to disclose them. The debtor appealed, but without success, to the Court of Appeal, and after that decision the trustee reported that the debtor disclosed to him the formulæ, and has since assisted as far as lay in his power regarding the conduct and sale of the business. The Official Receiver submitted that the debtor's assets were not of a value equal to 10s. in the £; that he had contributed to his bankruptcy by gambling, and that he had been guilty of misconduct in the bankruptcy proceedings in having attempted to deal with his assets in America after the date of the receiving order.

Mr. E. W. Hansell appeared as counsel on behalf of the debtor, and pointed out that he had already been undischarged for over three years. The matter of the formulæ was a genuine one of dispute, because it was taken to the Court of Appeal, and eventually constituted a reported case in the law reports. He asked that an immediate discharge should now be granted subject to a nominal judgment.

His Honour agreed to this, and said there would be judgment for 30s.

An Arbitration Dispute

A KING'S Bench Divisional Court, consisting of Mr. Justice Sankey and Mr. Justice Greer, on Wednesday, April 30, heard a case between Mr. Jean H. Bregeat, of Paris, and the Leto Photo Materials Co. (1905), Ltd., of Edgware. Mr. R. A. Willes, for the Leto Photo Materials Co., said that his clients wished to set aside an award of two arbitrators in a matter of arbitration between the two parties arising out of a contract of April, 1920. It amounted to a licence by Mr. Bregeat to the Leto Photo Materials Co. to work a process for reclaiming ether alcohol from gases in their works, and an agreement by Mr. Bregeat to supply plant for the purpose of working his patent under the licence. The dispute arose over payment of royalties for the licence and the price of the plant, the purchasers and licensees disputing the efficiency of the plant. The arbitrators held that the licensees should continue payment, but awarded them a certain sum as damages, as the plant was not in accordance with the contract. They also held that the licensor was not entitled to be paid for the attendance of his engineers at the works of the licensee, and that the costs and charges of the award should be paid by the two parties. The Court decided to set aside the award and remitted the whole matter to the same arbitrators for further consideration.

Receiver for Chemical Co.

IN the debenture holders' action of Higham *v.* London Chemical Works Co., Ltd., Mr. Justice Romer in the Chancery Division, on Friday, May 2, appointed a receiver and manager of the company. Mr. Draper, for the plaintiff, said that the company were manufacturing chemists, and there were 30 debentures, of which the plaintiff held three. The principal had become due owing to the interest being in arrears from last November, and several executions had been levied.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, May 8, 1924.

A FAIR amount of business has passed during the last week, and values have been well maintained.

The slight improvement in the export demand continues, and with the rising prices on the Continent, overseas' buyers may be expected to take more interest in this market.

General Chemicals

ACETONE is in active demand. Spot supplies are very scarce.

ACETIC ACID.—A fair volume of business is passing at recent levels.

ACID CITRIC is only in small demand, but the price is very firm.

ACID FORMIC.—Parcels near to hand are eagerly competed for. The forward situation is unchanged.

ACID LACTIC is unchanged.

ACID OXALIC is rather slow of sale, price unchanged.

BARIUM CHLORIDE is unchanged.

BLEACHING POWDER is unchanged.

COPPER SULPHATE.—A fair business is passing.

CREAM OF TARTAR has advanced in price, and is scarce for early delivery.

FORMALDEHYDE is unchanged.

LEAD ACETATE is in active demand.

METHYL ALCOHOL is lower in price.

POTASSIUM CARBONATE AND CAUSTIC are unchanged.

POTASSIUM PERMANGANATE.—The market is dead, the tendency is in buyers' favour.

POTASSIUM PRUSSIATE is unchanged.

SODA ACETATE is very scarce. Works are well sold for months ahead.

SODA BICHROMATE is in good demand, and foreign makers' prices are hardening.

SODA HYPOSULPHITE is unchanged.

SODA NITRITE is in good demand, and scarce in all early positions.

SODA PHOSPHATE is unchanged.

SODA PRUSSIATE is lifeless.

SODA SULPHIDE unchanged.

Pharmaceutical Products

ACETYL SALICYLIC ACID continues in fair demand with Continental supplies offering more freely.

BARBITONE is quiet, and in buyers' favour.

BROMIDES.—The London market is now selling below the Continental prices, which manufacturers claim are unremunerative. Second-hand stocks of potassium and sodium continued to be offered here cheaply, and the long-looked-for improvement is consequently held in check.

MERCURIALS.—Supplies appear to exceed the demand. Makers have not yet advanced their quotations, although mercury has risen since the last scale was fixed.

GUAIACOL is easier.

HEXAMINE is firm.

METOL has advanced.

PHENACETIN is steadier. Some cheap offers are still reported.

VANILLIN tends upwards.

Coal Tar Intermediates

Business has been much brisker in this market during the last week, and most values are inclined to be firmer.

ALPHA NAPHTHOL.—This remains steady.

ALPHA NAPHTHYLAMINE is quieter, without change in value.

ANILINE OIL AND SALT are unchanged.

BENZIDINE BASE.—Good home trade.

DIMETHYLANILINE has been much brisker.

"H" ACID.—A steady home trade.

NITROBENZOL.—A good demand for home trade, and the price is firm.

PARANITRANILINE is still in demand for export.

RESORCINE is somewhat quieter.

XYLIDINE.—A steady home trade.

Coal Tar Products

The market for coal tar products is quiet, and very little business is being done.

90% BENZOL is worth 1s. 6d. per gallon on rails, and remains quiet.

PURE BENZOL.—There is no change to report since last week, and the price remains steady at 1s. 11d. per gallon on rails, with very little inquiry.

CREOSOTE OIL is rather weaker, being worth 7d. to 7¼d. per gallon on rails in the north, while the price in London remains steady at 8½d. per gallon.

CRESYLIC ACID is weaker, the Pale quality 97/99% being worth 1s. 11d. to 2s. per gallon on rails. The Dark quality 95/97% is in very little demand, and is worth 1s. 9d. per gallon on rails.

SOLVENT NAPHTHA remains firm at 1s. 3d. per gallon on rails.

HEAVY NAPHTHA also remains firm at 1s. 2d. to 1s. 3d. per gallon on rails.

NAPHTHALENES.—There are large quantities of crude qualities offering, and the price is weak at about £6 to £6 10s. per ton. There is very little demand for the higher grades, the 76/78 melting point being worth £8 10s. to £9 per ton.

PITCH remains quiet, and values are unchanged. A little more interest is shown for next season's business, and makers are asking a premium of 5s. to 7s. 6d. per ton for that period.

Sulphate of Ammonia

There are no new features to report.

English China Clays

Importance of Associated China Clays, Ltd.

AT the annual meeting, held in London on April 29, Mr. R. Martin, the chairman, in moving the adoption of the report and accounts, already published in a previous issue, said that the world's consumption of china clay was still far below the pre-war total, and the production of foreign domestic clays was on the increase. Taking those two factors into consideration, it was somewhat surprising that the company had done so well. It was not difficult to picture how very different the state of affairs would have been without the existence of the Associated China Clays, Ltd. In 1918 the difficulties of the approaching period were foreseen, and steps were taken to create an organisation which would give to the china clay companies and their employees a chance of living through a period of depression. The principles on which it had been worked were not those of limited output, and consumers had not been called upon to pay excessive prices. Without the Associated China Clays the period would have been one of extreme competition, in which even the strongest would have suffered and the weak would have gone to the wall.

These possibilities had up to the present been avoided, although at the time the report was issued there was grave doubt whether at this meeting the directors might not have to notify the shareholders of the voluntary winding up of the association. Unfortunately its membership included some who were not content with the average benefits enjoyed by all but who sought to "snatch" some extra benefits for themselves. The demand for china clay during 1923 showed some improvement over that of 1922, in spite of the fact that the home market, especially the paper trade, had been very depressed. The violent fluctuations in the Continental exchanges had adversely affected trade with France, Belgium, and Italy, and the disturbed state of affairs in India had made business with that country both difficult and hazardous. America, on the other hand, had increased her co nsumption materially. Association shipments for the first three months of 1924 were some 30,000 tons better than those for the corresponding period of 1923, and, with the prospect of a settlement of the Reparations question and of the stabilisation of the exchanges, he thought they could look forward to an improvement in trade generally.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	100	0	0	to	101	0	0
Acid, Acetic, glacial, 99–100%	ton	71	0	0	to	73	0	0
Acetic, 80% pure	ton	47	10	0	to	48	10	0
Acetic, 40% pure	ton	25	0	0	to	25	10	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7¾	to	0	0	8
Citric	lb.	0	1	5¾	to	0	1	6
Formic, 85%	ton	63	0	0	to	64	0	0
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol	ton	37	0	0	to	39	0	0
Lactic, 60 vol	ton	43	0	0	to	45	0	0
Nitric, 80 Tw	ton	23	0	0	to	25	0	0
Oxalic	lb.	0	0	5¼	to	0	0	5½
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9½	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	0	to	0	2	3
Tartaric	lb.	0	1	1½	to	0	1	2
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	23	0	0	to	24	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	7	10	0	to	8	10	0
Sulphate, 17–18%	ton	8	10	0	to	9	10	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	30	0	0	to	32	0	0
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	32	0	0	to	33	0	0
Nitrate (pure)	ton	40	0	0	to	45	0	0
Phosphate	ton	63	0	0	to	65	0	0
Sulphocyanide, commercial 90%	lb.	0	1	5	to	0	1	6
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	63	0	0	to	65	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	14	0	0	to	14	10	0
Nitrate	ton	37	0	0	to	40	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	0	0	to	10	10	0
Borax crystals, commercial	ton	25	0	0	to		—	
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	19	10	0	to	20	10	0
Carbide	ton	13	0	0	to	13	10	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	80	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	24	0	0	to	24	10	0
Cream Tartar, 98–100%	ton	82	0	0	to	85	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol	ton	62	0	0	to	63	0	0
Formusol (Rongalite)	lb.	0	1	11	to	0	2	0
Glauber salts, commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols	gal	0	1	10	to	0	2	0
Iron perchloride	ton	20	0	0	to	22	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	49	10	0	to	50	0	0
Carbonate (White Lead)	ton	50	0	0	to	52	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	50	0	0	to	51	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	4	0	0	to	4	5	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	9	0	0	to	10	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	48	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	81	0	0	to	82	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate double salt	ton	37	0	0	to	38	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	5¾	to		—	
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to		—	
Metabisulphite, 50–52%	ton	63	0	0	to	65	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	8	to	0	0	8½
Prussiate, red	lb.	0	1	10	to	0	2	0
Prussiate, yellow	lb.	0	0	8½	to	0	0	9
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	2	15	0	to		—	
Seconds	cwt.	2	17	6	to		—	
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to		—	
Bisulphite, 60–62%	ton	20	0	0	to	22	0	0
Chlorate	lb.	0	0	2½	to	0	0	3
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	0	0	to	10	10	0
Nitrite, 96–98%	ton	29	0	0	to	30	0	0
Phosphate, crystal	ton	15	10	0	to	16	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	5½	to	0	0	6
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62%	ton	15	0	0	to	16	10	0
Sulphite, cryst	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	1	0	to	0	1	1
Tin perchloride, 33%	lb.	0	1	4	to	0	1	5
Perchloride, solid	lb.	0	1	5	to	0	1	6
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	10
Zinc chloride 102° Tw	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	14	0	0	to	15	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	4	to	0	3	6
Acetanilid	lb.	0	2	4	to	0	2	6
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, I.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	1	10	to	0	2	0
Tannic, leviss	lb.	0	3	0	to	0	3	3
Amidol	lb.	0	8	6	to	0	9	0
Amidopyrin	lb.	0	13	6	to	0	14	0
Ammon ichthosulphonate	lb	0	1	10	to	0	2	0
Barbitone	lb.	0	15	6	to	0	16	0
Beta naphthol resublimed	lb.	0	3	6	to	0	4	0
Bromide of ammonia	lb.	0	0	11	to	0	1	0
Potash	lb.	0	0	8	to	0	0	8½
Soda	lb.	0	0	8½	to	0	0	9
Caffeine, pure	lb.	0	12	0	to	0	12	6
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	6	to	0	1	9
Calomel	lb.	0	3	9	to	0	4	0
Chloral hydrate	lb.	0	3	10	to	0	4	0
Cocaine alkaloid	oz.	1	0	0	to	1	2	6
Hydrochloride	oz.	0	17	0	to	0	17	6
Corrosive sublimate	lb.	0	3	3	to	0	3	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	2	0	to	0	2	2
B.P. (75–80% eucalyptol)	lb.	0	2	1	to	0	2	3
Guaiacol carbonate	lb.	0	12	0	to	0	12	6
Liquid	lb.	0	10	6	to	0	11	0
Pure crystals	lb.	0	11	0	to	0	11	6
Hexamine	lb.	0	3	9	to	0	4	0
Hydroquinone	lb.	0	4	6	to	0	5	0
Lanoline anhydrous	lb.	0	0	8	to	0	0	9
Lecithin ex ovo	lb.	1	5	0	to	1	7	6
Lithi carbonate	lb.	0	9	9	to	0	10	3
Methyl salicylate	lb.	0	2	6	to	0	2	9
Metol	lb.	0	11	6	to	0	13	6
Milk sugar	cwt.	3	17	6	to	4	5	0
Paraldehyde	lb.	0	1	5	to	0	1	7
Phenacetin	lb.	0	6	6	to	0	6	9
Phenazone	lb.	0	7	9	to	0	8	3
Phenolphthalein	lb.	0	7	3	to	0	7	6
Potassium sulpho guaiacolate	lb.	0	6	3	to	0	6	9
Quinine sulphate, B.P.	oz.	0	2	3	to		—	

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	6	to	0	6	0
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	9	to	0	3	0
Salol	lb.	0	4	0	to	0	4	3
Soda Benzoate	lb.	0	2	9	to	0	3	0
Sulphonal	lb.	0	16	6	to	0	17	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	3
Soda salicylate	lb.	0	8	6	to	0	9	0
Vanillin	lb.	1	5	6	to	1	8	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	1	9	to	0	2	0
Refined	lb.	0	2	3	to	0	2	6
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	8¼	to	0	0	8¾
Salts	lb.	0	0	9	to	0	0	9½
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	9	to	0	3	0
Benzidine, base	lb.	0	4	4	to	0	4	7
Sulphate	lb.	0	3	4	to	0	3	7
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Crocoisine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	10	to	0	0	11
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	3	to	0	1	4
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	8	to	0	2	10
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	4	3	to	0	4	6
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	4	to	0	2	6
Naphthionate of Soda	lb.	0	2	4	to	0	2	6
Naphthylamine-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	6	to	0	2	8
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	9	to	0	0	10
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	c.i.f. 2/6 spot	0	2	8
Bay		0	10	6
Bergamot		0	18	0
Cajuput		0	3	3
Camphor, white	per cwt.	3	10	0
Brown	„	3	10	0
Cassia	c.i.f. 7/3, spot	0	8	0
Cedarwood		0	1	9
Citronella (Ceylon)	dearer, c.i.f. 3/4, spot	0	3	7
(Java)	dearer, c.i.f. 4/10, spot	0	5	0
Clove		0	8	0
Eucalyptus		0	2	1
Geranium Bourbon		1	13	0
Lavender		1	5	0
Lavender Spike		0	6	0
Lemon		0	3	6
Lemongrass	per oz.	0	0	2¾
Lime (distilled)		0	5	0
Orange sweet (Sicilian)		0	12	9
(West Indian)		0	10	0
Palmarosa		0	18	0
Peppermint (American)		1	1	0
Mint (dementholised Japanese)		0	18	0
Patchouli		1	2	6
Otto of Rose	per oz.	1	15	0
Rosemary		0	1	9
Sandalwood		1	5	0
Sassafras		0	10	0
Thyme	4/6 to	0	5	6

Synthetics.		£	s.	d.
Benzyl acetate	per lb.	0	3	6
Benzoate	„	0	3	6
Citral	„	0	10	0
Coumarine	„	1	0	0
Heliotropine	„	0	8	0
Ionone	„	1	5	0
Linalyl acetate	„	1	12	6
Methyl salicylate	„	0	2	6
Musk xylol	„	1	0	0
Terpeniol	„	0	2	9

Port of London Authority's Charges

Revision of Chemical Classification

The British Chemical and Dyestuff Traders' Association announce that negotiations between the Port of London Authority and the joint Commercial and Mercantile Committee of the London Chamber of Commerce (on which the Association is represented) have continued, and as a result the Port Authority have intimated in reply to the case submitted by the Association's representative in respect of charges on chemicals that "The Authority agreed that the comparative figures supplied for London and other ports in respect of chemicals indicated considerable anomalies. The Authority were quite prepared to consider the question of a revision of the classification of chemicals in conjunction with the British Chemical and Dyestuff Traders' Association, Limited."

"We are proceeding," the Association states, "on these lines, and shall be glad if members will assist in obtaining the fullest possible concessions by furnishing us with particulars of all P.L.A. charges for chemicals, dyestuffs and allied products which, in their opinion, are too high, especially when compared with out-port rates. General statements will be of little or no use, as in dealing with the Port Authority we shall have to substantiate our case with actual figures and facts. It may be found necessary—in fact, it is most likely—to submit proposals for many new classifications. This will entail considerable work and careful consideration. Members will appreciate the importance of this matter, and to enable us to secure the full benefit of the coming negotiations we shall require every possible support and assistance from them by way of detailed information."

Dyestuff Licences for April

The following statement relating to applications for licences under the Dyestuffs (Import Regulation) Act, 1920, made during April has been furnished to the Board of Trade by the Dyestuffs Advisory Licensing Committee :—

The total number of applications received during the month was 484, of which 380 were from merchants or importers. To these should be added 22 cases outstanding on April 1, making a total for the month of 506. These were dealt with as follows :—Granted—360 (of which 329 were dealt with within seven days of receipt). Referred to British makers of similar products—84 (of which 63 were dealt with within seven days of receipt). Referred to Reparation supplies available—30 (all dealt with within two days of receipt). Outstanding on April 30, 1924—32 (practically the whole of these were dealt with at meeting held May 2). Of the total of 506 applications received, 422 or 83 per cent. were dealt with within seven days of receipt.

Potash from Sunflower Stalks

In spite of crop failures and famine at home, Russia has been within the past two years exporting considerable quantities of potash. Russian potash is said to be extracted from the rich soils of south-eastern Russia by burning the stalks of sunflowers which are extensive grown there. Last year more than half-a-million acres were devoted to this purpose, the yield of potash being from 160 to 190 pounds to the acre. Russian potash, before the war, was successfully sold in Germany in competition with the local product, partly because of its better quality and partly because of its lower price.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

GLASGOW, *May* 8, 1924.

During the past week business in the heavy chemical market has been decidedly more brisk, there being good inquiry both for spot and forward delivery.

Quotations for Continental products are inclined to be higher, and prices named for spot material consequently a little firmer than a week ago.

Industrial Chemicals

ACID ACETIC.—Glacial, 98/100% now quoted £61 to £69 per ton; 80% pure, £49 to £51 per ton; 80% technical, £46 to £48 per ton—all packed in casks, delivered c.i.f. U.K. port duty free.

ACID BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Moderate inquiry for export. Price unchanged at about 8¼d. to 8½d. per lb., carriage paid, or f.o.b. U.K. port.

ACID CITRIC, B.P. CRYSTALS.—Offered for early delivery at 1s. 5¾d. per lb., less 5 per cent. ex wharf. Spot material quoted 1s. 6d. per lb., less 5 per cent., ex store.

ACID FORMIC 85%.—Price remains unchanged at about £63 per ton, ex store. Offered for early delivery at about £61 per ton, c.i.f. U.K. port.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—In little demand. Offered at 5¼d. per lb., ex store, spot delivery. Quoted 5d. per lb. c.i.f. U.K. port, prompt shipment from the Continent.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Good inquiry. Prices inclined to be higher at about 1s. 1¾d. per lb., less 5 per cent., ex store.

ALUMINA SULPHATE 17/18% IRON FREE.—Quoted £8 2s. 6d. per ton, ex store, spot delivery.

ALUM CHROME.—Ammonium Chrome alum quoted £19 to £21 per ton, according to quality, f.o.b. U.K. port. Potash chrome alum about £26 per ton, ex store or station.

ALUM POTASH (LUMP).—Spot material unchanged at about £10 17s. 6d. per ton, ex store. Offered from the Continent at about £9 10s. per ton, c.i.f. U.K. port. Crystal quality about 10s. per ton less.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 5½d. per lb., ex station, prompt delivery.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K.

AMMONIA LIQUID 880°.—Unchanged at 2½d. to 3d. per lb., delivered, according to quantity. Containers extra.

AMMONIA MURIATE.—Grey galvanisers' quality on offer at £30 per ton, ex station or delivered f.o.b. U.K. port. Good inquiry for export; fine white crystals offered from the Continent at about £26 per ton, c.i.f. U.K. port.

AMMONIA SULPHATE.—25¼%, £13 12s. per ton; 25¾% neutral quality, £14 15s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Good inquiry for export. Offered at about £55 to £57 per ton, f.o.b. U.K. port. Spot lots on offer at about £59 per ton, ex store.

BARIUM CHLORIDE 98/100%.—English material unchanged at about £14 per ton, ex store. Offered from the Continent at £13 5s. per ton, c.i.f. U.K. port.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental about £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s.6d. per ton, ex station. Continental quoted £4 15s. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £2 5s. per ton, f.o.b. U.K. port, in bulk. Quoted £3 5s. to £3 10s. per ton, in casks.

COPPER SULPHATE.—Unchanged at about £25 per ton, ex store. Spot lots of Continental material on offer at slightly less.

FORMALDEHYDE 40%.—Moderate inquiry and price unchanged at about £63 per ton, ex store, spot delivery.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental on offer at about £3 5s. per ton, c.i.f. U.K. port.

LEAD, RED.—Continental material now on offer at about £39 per ton, ex store, spot delivery.

LEAD, WHITE.—Spot material on offer at about £43 per ton, ex store.

LEAD, ACETATE.—Moderate inquiry and little material available. White crystals quoted £47 10s. per ton, ex store; brown about £46 10s. per ton, ex store; white crystals offered from the Continent at £46 per ton, c.i.f. U.K. port.

MAGNESITE CALCINED.—English ground material offered at £8 per ton, ex station. Moderate inquiry for export.

MAGNESIUM CHLORIDE.—Good inquiry. Spot material on offer at about £4 per ton, ex store. Offered from the Continent at about £3 10s. per ton, c.i.f. U.K. port.

MAGNESIUM SULPHATE (EPSOM SALTS).—English material, commercial quality, on offer at about £5 per ton, ex store. B.P. quality quoted £6 5s. per ton, ex station. Commercial quality offered from the Continent at about £3 12s. 6d. per ton, c.i.f. U.K. port.

POTASH CAUSTIC 88/92%.—Good inquiry. Spot lots available at about £31 10s. per ton, ex store. Offered from the Continent at about £30 per ton, ex wharf.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb. delivered.

POTASSIUM CARBONATE 96/98%.—Continental quotations inclined to be higher. Now quoted £25 per ton, c.i.f. U.K. ports. Spot lots available at about £26 10s. to £27 per ton, ex store.

POTASSIUM CHLORATE.—Spot lots available at 3¼d. per lb., ex store, in little demand.

POTASSIUM NITRATE (SALTPETRE).—Offered from the Continent at about £27 5s. per ton, c.i.f. U.K. port. Spot lots available at about £30 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Unchanged at 9d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—English material quoted 8½d. per lb., f.o.b. U.K. port. Offered for spot delivery at about the same price, ex store.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62% broken, £19 2s. 6d. per ton; 98/99% powdered, £22 15s. per ton. All ex station, spot delivery, contracts 20s. per ton less.

SODIUM ACETATE.—Continental quotations advanced to about £23 15s. per ton, c.i.f. U.K. port. Spot lots now quoted £25 10s. per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English makers' prices unchanged at 4½d. per lb., D/d.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £10 per ton, ex station. Continental on offer at slightly less. Pea crystals of English manufacture quoted £14 10s. per ton, ex station.

SODIUM NITRATE.—Refined, 96/98% quality, unchanged at £13 10s. to £13 15s. per ton, f.o.r. or f.o.b. U.K. port.

SODIUM NITRITE, 100%.—Moderate inquiry. Price about £28 per ton, f.o.b. U.K. port.

SODIUM PRUSSIATE (YELLOW).—British material offered for export at about 4¾d. per lb., f.o.b., U.K. port. Continental on offer at about the same price, c.i.f. U.K. port.

SODIUM SULPHATE (SALTCAKE).—Manufacturers advise reduction in price of 15s. per ton. Now £3 10s. per ton, carriage paid, buyers' stations, quoted at about 65s. per ton, f.o.b. U.K. port, for export.

SODIUM SULPHIDE.—60/65% Solid English make, £14 15s. per ton, ex station; broken, £1 per ton more; flake, £2 per ton more; 60/62% solid offered from the Continent at £12 10s. per ton, c.i.f. U.K. port. Broken, £1 per ton more; 31/34% crystals, English make, £9 2s. 6d. per ton, ex station; 30/32% crystals, Continental make, £8 12s. 6d. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

ZINC CHLORIDE, 98/100%.—Quoted £26 10s. per ton, f.o.b. U.K. port.

ZINC SULPHATE.—English material about £13 10s. per ton, ex store. Offered from the Continent at £11 7s. 6d. per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—Good inquiry. Price quoted 1s. 5d. lb., delivered, or f.o.b.

BETA NAPHTHOL.—Good inquiry. Price quoted, 1s. 1d. lb., f.o.b.

BENZALDEHYDE.—Small inquiry. Price quoted 2s. 4d. lb., delivered, drums returnable.

DIPHENYLAMINE.—Good inquiry for export. Price quoted, 3s. 1d. lb., f.o.b.

G. SALT.—Some inquiry for export. Price quoted 3s. lb., 100% basis, f.o.b.

PHTHALIC ANHYDRIDE.—Fair inquiry. Price quoted, 2s. 1d. lb., delivered.

R. SALT.—Some export inquiry. Price quoted 2s. 6d. lb., 100% basis.

XYLIDINE.—Some inquiry. Price 1s. 10d. lb., delivered, drums returnable.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

TENDERS INVITED FOR LINSEED OIL.—The Tender Board of the South African Railway Headquarter Offices at Johannesburg is calling for tenders, to be presented by June 2, for raw and double boiled linseed oil for the six months ending December 31, 1924. Ref. No. D.O.T. 13613/E.D./C.C./2.

DEMAND FOR VARNISHES AND ENAMELS.—The Tender Board of the South African Railway Headquarters Offices at Johannesburg are calling for tenders, to be presented by June 2, 1924, for the supply of varnishes and free-flowing enamels for the period August 1, 1924, to July 31, 1925. Ref. No. D.O.T. 13615/E.D./C.C./2.

CATALOGUES FOR DENMARK.—The Librarian of Industriforening (Industrial Association) Vesterbrogade 1, Copenhagen, is desirous of securing catalogues of United Kingdom firms manufacturing or dealing in new products—*e.g.*, new chemicals, metals or alloys, etc. United Kingdom firms interested should forward their catalogues direct to the Librarian at the above address.

SULPHATE OF COPPER.—An agent established in Nantes is desirous of obtaining the representation of British firms for the sale in France of sulphate of copper. Ref. No. 509.

TECHNICAL CHEMICALS, ETC., FOR THE NETHERLANDS.—A firm of agents at Amsterdam are desirous of obtaining the representation in the Netherlands of British manufacturers of dry metal paints, technical chemicals, pharmaceutical specialities, chemists' and druggists' sundries, etc. Ref. No. 517.

TENDERS INVITED FOR CENTRIFUGAL PUMP, ETC.—The Argentine Sanitary Works at Buenos Aires are calling for tenders for the supply of pumping machinery and internal combustion engines. D.O.T. 9570/F.L./E.C./2.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, May 8, 1924.

LITTLE or no improvement in the volume of business transacted on the chemical market here can be reported this week. Home trade users continue to operate cautiously and purchases are largely for immediate needs, forward business being on an extremely small scale. Inquiries for export are coming to hand, but actual trade on overseas account is not heavy at the moment, and what there is is confined to a few staple lines. There has been little fresh movement in prices since last report, though the one or two changes have been in buyers' favour.

Heavy Chemicals

Prussiate of soda is attracting little attention, but values are maintained at last week's level of 4¾d. per lb. Sulphide of sodium is easy at £14 10s. to £14 15s. for 60–65 per cent. concentrated solid, and £9 10s. per ton for crystals; the demand for this article continues quiet. Glauber salts are inactive and are now quoted at round £3 10s. per ton. Alkali remains one of the few active sections, both for home and foreign consumption, and the price is steady at £6 15s. per ton for 58 per cent. quality to home users. Caustic soda, likewise, is fairly busy, values being well held and ranging from £16 17s. 6d. for 60 per cent. to £19 7s. 6d. for 76–77 per cent. strength. Chlorate of soda is in moderate request at 2¾d. per lb. Saltcake is now quoted at £3 10s. and £3 per ton respectively for home and export, with buying operations on a small scale. Hyposulphite of soda is selling only in limited quantities, but values are unchanged at £14 15s. for photographic crystals and £9 15s. per ton for commercial quality. Bicarbonate of soda is in comparatively small demand at £10 10s. per ton at works. Nitrite of soda is on offer at round £28 per ton; inquiry is not particularly brisk, but supplies of this material are still not excessive. Bleaching powder is rather quiet, but the price is steady at £10 per ton. Acetate of soda is maintained at £23 10s. to £24 per ton, though only a moderate amount of business is being put through. Phosphate of soda is dull and values are easy at £13 10s. per ton. Soda crystals are in quietly steady demand at £5 5s. per ton. Bichromate of soda is quotably unchanged from last report at 4¼d. per lb.

Caustic potash is selling fairly freely at £29 to £30 per ton for 90 per cent. material. Carbonate of potash is quiet but steady at £24 per ton. Yellow prussiate of potash is dull, and values are still easy at 8¼d. to 8½d. per lb. Permanganate of potash is weaker at 7d. to 8d. per lb., buying interest being still very small. Bichromate of potash continues to meet with some inquiry, and the price is maintained at 5¾d. per lb. Chlorate of soda is still inactive at 2¾d. to 3d. per lb.

The actual export demand for arsenic is restricted though inquiries for shipment are reported; in the meantime quotations are easy though no weaker than last week; white powdered, Cornish makes, is offering at £59 to £60 per ton, with foreign material at much lower rates. Some slight improvement in sulphate of copper is being felt and values are steadier at £25 per ton f.o.b. Acetate of lime is quiet and easy at £19 per ton for grey and £14 10s. to £15 for brown. Acetate of lead keeps fairly steady at £49 per ton for white and £47 for brown. Nitrate of lead is quiet but unchanged at £45 per ton. Commercial Epsom salts are in small demand at £4 10s. for British makes; magnesium sulphate, B.P., is quoted at £6 10s.

Acids and Tar Products

Tartaric acid is quiet but fairly steady at 1s. 1¼d. per lb. Citric acid is well maintained at 1s. 5¼d. per lb. Acetic acid is in moderate request at £47 per ton for 80 per cent. technical and round £70 for glacial. Oxalic acid is weak and inactive at 5d. to 5¼d. per lb.

Little change in the general position of the coal-tar products has occurred. Carbolic acid crystals are dull at 8d. per lb., and crude at 2s. per gallon. Pitch is quiet but steadier at £3 per ton, f.o.b. Solvent naphtha is firm and in quietly steady demand at 1s. 5¼d. to 1s. 6d. per gallon. Naphthalenes are unchanged at £16 per ton for refined and £7 and upwards for crude. Creosote oil is now on offer at 7¾d. per gallon, the demand being comparatively slow.

Company News

BARROW, HEPBURN AND GALE.—The directors announce a dividend of 4½ per cent. on the preference shares, bringing arrears of dividend up to September, 1922.

LIVERPOOL NITRATE CO.—An interim dividend at the rate of 1s. 6d. per share, less tax, is announced; payable on May 27. The transfer books will be closed from May 6 to 26, inclusive.

CHLORIDE ELECTRICAL STORAGE CO.—The directors propose a final dividend of 5 per cent. and a bonus of 2s. per share, both tax free, on the ordinary shares, making 30 per cent. for the year.

CASTNER-KELLNER ALKALI CO.—An interim dividend at the rate of 8 per cent. (actual), has been declared for the six months ended March 31. The dividend a year ago was the same.

BRUNNER, MOND AND CO., LTD.—The directors recommend a further dividend on the ordinary shares of 7 per cent., less tax, making 10½ per cent. for the year to March 31 last, against 11 per cent. for 1922-23.

THARSIS SULPHUR AND COPPER CO., LTD.—A dividend for the year ended December 31 last is announced at the rate of 4s. per share, equal to 10 per cent., less income tax at 4s. 7½d. per £1, payable on and after May 10.

NEW PACCHA AND JAZAMPA NITRATE CO.—The accounts to December last show a trading profit for the year in Chile of £8,231, to which is added the balance brought forward, making a total of £9,247. The directors propose a distribution of 6 per cent., leaving to be carried forward £3,718.

ZINC CORPORATION, LTD.—The directors recommend a final participating dividend for 1924 of 2s. per share on both the preference and the ordinary shares, payable on June 19. A dividend of 2s. per share on the preference shares has been declared, being the first half of the fixed preferential dividend for 1924, payable on June 19.

ENGLISH CROWN SPELTER.—The final results for the year 1923 show a credit balance of £2,331, and £2,289 was brought in, making a total of £4,620. The directors recommend that £5,000 be transferred from equalisation of dividend reserve to credit of profit and loss, and that a dividend of 2s. per share, less tax at 4s. 7½d. in the £, be paid, carrying forward £1,933. Meeting, White's House, Port Tennant, Swansea, May 14, at 3 o'clock.

TARAPACA AND TOCOPILLA NITRATE CO., LTD.—The report of the directors for the year 1923 states that the net profit amounts to £43,634, which, with £54,682 brought in, makes an available balance of £98,316. The directors have placed to reserve £30,000, and they recommend the payment of a dividend of 12½ per cent., less tax, leaving £29,879 to be carried forward. The annual general meeting will be held at River Plate House, Finsbury Circus, London, on May 19.

ANGLO-CHILIAN NITRATE AND RAILWAY CO., LTD.—The profit from all sources for the year 1923 amounts to £151,718, which, with £69,984 brought in, makes a total of £221,702. An interim dividend of 1s. per share, free of tax, on both classes of shares was paid in November last, and the directors now propose a further distribution, payable on May 16, of 2s. per share, free of tax, making a total dividend of 15 per cent., free of tax, on the share capital for the year, leaving a balance of £86,702 to be carried forward. The ordinary general meeting will be held at Winchester House, Old Broad Street, London, on May 13.

BRYANT AND MAY, LTD.—The net profits for the year 1923 amount to £295,694, and £24,311 was brought in, making a total of £320,005. The directors place to reserve fund £40,000; allocate to Brymay pension fund £10,000, and to employés' benefit fund £10,000, and recommend further dividends on the preference shares, making 14 per cent. for the year: 4 per cent. on 931,011 ordinary shares, making 8 per cent. for the year, free of tax; on 27,543 partnership shares 4 per cent., making 8 per cent. for the year, free of tax; and under Brymay Co. partnership 4½ per cent. on ordinary shares, free of tax; employés' proportion, £41,895; carrying forward £32,331. The ordinary general meeting will be held at the Fairfield Works, Bow, London, on May 14, at 2.30 p.m.

New Chemical Trade Marks

Applications for Registration

[*This list has been specially compiled for us by Mr. H. T. P, Gee, Patent and Trade Mark Agent, 51 and 52, Chancery Lane, W.C.2, from whom further information may be obtained. Opposition to the Registration of the following Trade Marks can be lodged up to June 7, 1924.*]

"RAB."

439,801. For lithopone. James Cook Bird, trading as Robert A. Bird and Co., 140, West George Street, Glasgow, merchant. August 13, 1923. (To be Associated. Sect. 24.)

443,284. For disinfectants. Newton, Chambers & Co., Ltd., Thorncliffe Ironworks and Collieries, near Sheffield; manufacturers. December 4, 1923. (To be associated. Sect. 24.)

"GRIPOLAC."

444,601. For paints and varnishes. Pinchin, Johnson and Co., Ltd., General Buildings, Aldwych, London, W.C.2, varnish, colour and paint manufacturers. January 19, 1924. (To be Associated. Sect. 24.)

"VENECIN."

446,350. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Venecin Aktiengesellschaft für Chemische Produkte (a Joint Stock Company organised under the laws of Germany), 216, Kurfurstendamm, Berlin, W., Germany, manufacturers. March 14, 1924. (To be Associated. Sect. 24.)

"NITROPHENE."

446,891. For fertilisers. Robert A. Munro and Co., Ltd., 140, West George Street, Glasgow, chemical manufacturers. March 27, 1924.

"COLAS."

445,365. For bituminous emulsions for use in manufactures. Asphalt Cold Mix, Ltd., 38, Parliament Street, Westminster, London, S.W.1, manufacturers. February 12, 1924. (To be Associated. Sect. 24.)

"COLASOID."

445,366. For bituminous emulsions for use in manufactures. Asphalt Cold Mix, Ltd., 38, Parliament Street, Westminster, London, S.W.1, manufacturers. February 12, 1924. (To be Associated. Sect. 24.)

446,025. For oils for use in manufactures, not included in other classes. Blundell, Spence and Co., Ltd., 9, Upper Thames Street, London, E.C.4, and Beverley Road, Hull, paint, colour, oil and varnish manufacturers. March 6, 1924. (To be Associated. Sect. 24.)

Business Changes

The telephone numbers of the W. J. Southcombe Advertising Agency, 167, Strand, London, W.C.2, are now City 5093-4.

The title of "The Courtman Stock Complete Service Advertising Agency" has been changed to "The Courtman Stock Advertising Service Agency, Ltd.," and the address from 6, Market Place, Huddersfield, to 99, Albion Street, Leeds.

Mr. C. Hearth announces that he has converted his business into a limited liability company, under the title of "C. Hearth, Ltd.," advertising service agents, 12, Market Street, Bradford, and has discontinued "Bradford Advertising Agency." There has been no change in management or staff.

Mr. Thos. Vickers, C.E., late of the British Cast Iron Research Association, has started in private practice as a foundry consulting engineer, with offices at 14, New Street, Birmingham.

Mr. R. M. Catterson-Smith states that he has removed his works from Euston to 429B, King's Road, Chelsea, S.W.10, for the manufacture of small standard electric furnaces.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

DANIELS (SOUTHERN), LTD., St. Thomas Street, Portsmouth, soda merchants. (C.C., 10/5/24.) £47 4s. 1d. March 18.

HARCOLITE LUBRICANTS (a firm), 1A, Blackbank Street, Bolton, oil refiners. (C.C., 10/5/24.) £19 6s. March 12.

LAMPLOUGH, L., The Ryepeck, Bray, analytical chemist. (C.C., 10/5/24.) £30 10s. 10d. March 27.

McLEODS (HULL), LTD., St. Andrews Works, Mason Street, Hull, chemists. (C.C., 10/5/24.) £48 15s. March 18.

WRIGHT, Ernest, Rosedene, The Glen, Saltaire, Bradford, manufacturing chemist. (C.C., 10/5/24.) £38 14s. January 29.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

COLEMAN BROTHERS, LTD., Manchester, cattle food manufacturers. (M., 10/5/24.) Registered April 25, £1,000 debentures (filed under section 93 (3) of the Companies (Consolidation) Act, 1908), present issue £500; general charge.

DONALD (EDWARD), LTD., Birmingham, manufacturers of toilet specialities. (M., 10/5/24.) Registered April 24, £200 debenture, to Mrs. M. J. Walker-Pitt, 227, Church Hill Road, Handsworth; general charge.

GREGORY (WILLIAM), LTD., London, S.E., manufacturing chemists. (M., 10/5/24.) Amended return registered April 23, amending return registered July 16, 1921, from £300 and £300 debentures to £300 debentures only.

MACSONS, LTD., Blyth, manufacturing chemists. (M., 10/5/24.) Registered April 17, collateral charge to bank; charged on properties at corner of Middleton Street and Union Street, Blyth. *Nil. November 8, 1923.

STOCKTON, THORNABY AND DISTRICT BUTCHERS' BY-PRODUCTS, LTD. (M., 10/5/24.) Registered April 24, further charge, to bank; charged on property charged by the mort. *Nil. December 31, 1922.

Satisfactions

KIRKALDY (J.) AND SON, LTD., London, E., paint manufacturers. (M.S., 10/5/24.) Satisfaction registered April 26, £3,000 part of amount registered. July 31, 1906.

LARNE SALT AND ALKALI CO., LTD., London, E.C. (M.S., 10/5/24.) Satisfaction registered April 24, £14,550, registered March 2, 1912, to May 31, 1917.

Receiverships

AUSTAKER MANUFACTURING CO., LTD. (R., 3/5/24.) E. Hope, of 20, Willow Street, Accrington, was appointed receiver and manager on April 17, under powers contained in debenture dated January 16, 1924.

CATALYTIC CHEMICAL CO., LTD. (R., 10/5/24.) F. R. Jutsam, of "Wychling," Morgans Lane, Hayes End, Middlesex, was appointed receiver and manager until after April 29, by order of the Court dated April 22, 1924.

MAGADI SODA CO., LTD. (R., 3/5/24.) J. Tait, of Basildon House, Moorgate, E.C., was appointed receiver and manager by Order of Court dated April 3, 1924 (in substitution for A. W. Tait appointed by Order dated March 2, 1923).

London Gazette

Reduction of Capital

DAMPNEY (J.) AND CO., LTD., and Reduced. (R.C., 10/5/24.) A petition presented to the High Court of Justice on the 7th day of December, 1923, for confirming the reduction of the capital of the company from £120,000 to £59,000, is to be heard before Mr. Justice Romer on Friday, May 16.

Company Winding Up Voluntarily

DUBLIN SALT CO., LTD. (C.W.U.V., 10/5/24.) S. Colvin, chartered accountant (J. W. Davidson Cookson and Co., 6, Castle Street, Liverpool) appointed liquidator. (All creditors of the company have been or will be paid in full.)

Bankruptcy Information

JONES, William Thomas, late of Fletcher's Yard, Wellowgate, Great Grimsby, polish and dubbin manufacturer, trading as W. T. JONES AND SON. (R.O., 10/5/24.) Receiving order, April 29. Debtor's petition.

New Companies Registered

AZO SOAP CO., LTD., 353, Chester Road, Cornbrook, Manchester. Manufacturers of toilet and other kinds of soap, candles, glycerine, alkali and other chemical products. Nominal capital, £6,000 in £1 shares.

BASKER AND CO., LTD., 17, Fore Street, Bridgwater, wholesale manufacturing, retail and general chemists, druggists etc. Nominal capital, £3,000 in £1 shares (1,000 ordinary and 2,000 10 per cent. cumulative preference).

BAVISTOCK, LTD., manufacturers of and dealers in disinfectants, liquid and other fuels and chemicals of all kinds; chemists, druggists, etc. Nominal capital, £7,000 in £1 shares (2,000 preferred participating and 5,000 ordinary). Solicitors: Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, London.

E. M. CUTFIELD, LTD., 7, The Parade, Angmering-on-Sea, Sussex. Chemists, druggists, drysalters, oil and colourmen, etc., Nominal capital, £525 in 520 ordinary shares of £1 and 100 deferred shares of 1s.

F. PEGG AND CO., LTD., 47, Hollins Lane, Marple, Cheshire. Manufacturers of and dealers in chemicals, metals, minerals and other substances. Nominal capital, £200 in £1 shares.

Paint Company Winding Up

UNDER a winding up order made against the Devon and Cornwall Paint Co., Ltd., Sea King Works, West Quay Road, Poole, on March 26, the statutory meetings of the creditors and of the shareholders were held at the Board of Trade Offices, Carey Street, London, on Tuesday. A statement of the company's affairs was submitted showing 102 unsecured creditors with claims amounting in all to £7,891, in addition to which there were seven creditors whose claims amounted to £10,544, and who were treated as fully secured, with securities estimated to be of the value of £16,601. There were also preferential claims for £82 payable in full. The assets which were estimated to realise a net amount of £7,141, chiefly consisted of the estimated surplus of £6,056 to come from the securities held by the fully secured creditors. A deficiency of £750 was accordingly disclosed with reference to the creditors, while in relation to the shareholders a total deficiency of £16,475 was shown.

The Official Receiver said that the winding up order was made on the petition of a creditor. The failure of the company was attributed by the directors to insufficient capital, coupled with heavy expenditure on dremises, machinery and plant, and to inability to realise the company's investments in property at High Street, Poole, and also to the institution of proceedings for the repayment of certain loans, the effect of which was to destroy the company's credit. In the opinion of the Official Receiver the failure was also due to the expenditure of its funds on premises unsuitable for the purpose of the company and also on the Sterte premises when it was short of money and to the sale of its products at unremunerative prices.

A resolution was passed for the appointment of Mr. Pettitt, accountant, of Bournemouth, as liquidator of the company.